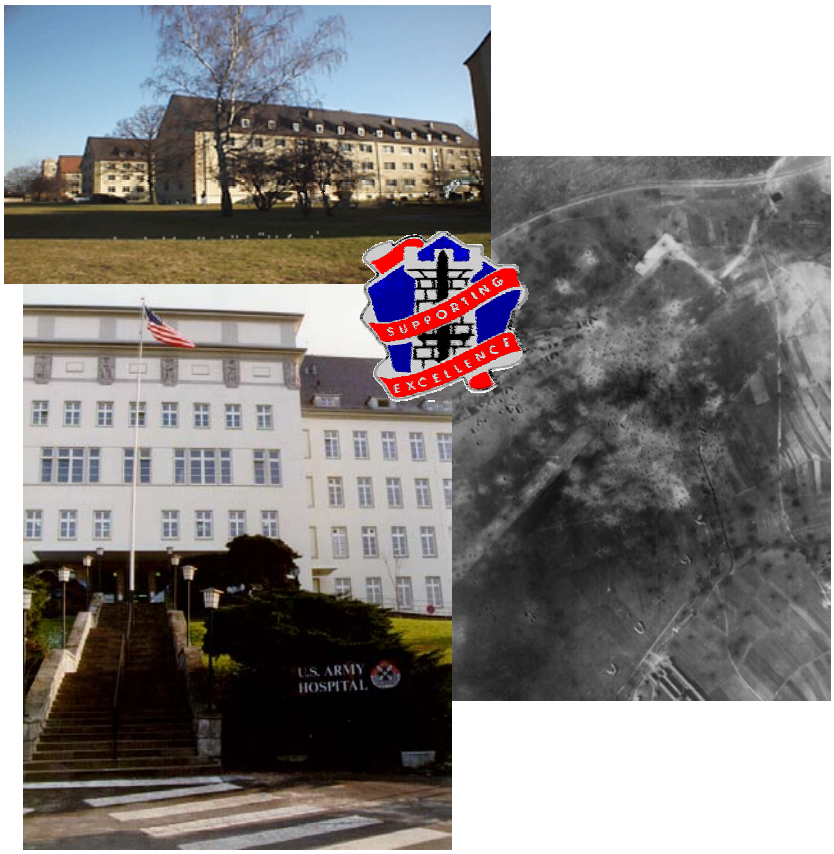
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE 417th BASE SUPPORT BATTALION KITZINGEN 2000-2004

VOLUME I - GENERAL INFORMATION



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FOR THE
U.S. ARMY ENGINEER DISTRICT, EUROPE
KONRAD-ADENAUER RING 39
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417th BSB WÜRZBURG

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ACRONYMS

AAFES	Air Force/Army Forces Exchange Services
AFH	Army Family Housing
ATC	Army Training Command
AR	Army Regulation
ASG	Area Support Group
AST	Area Support Team
BASOPS	Base Operations
BayWG	Bavarian Water Act (*Bayerisches Wassergesetz*)
BOD	Biochemical Oxygen Demand
BSB	Base Support Battalion
CAP	Conservation Assistance Program
CHPPM-EUR	Center for Health Promotion and Preventive Medicine
COD	Chemical Oxygen Demand
CONUS	Contiguous United States
DCA	Directorate of Community Affairs
DAPam	Department of the Army Pamphlet
DEH	Directorate of Engineering and Housing
DoD	Department of Defense
DoDDS	Department of Defense Dependent Schools
DOT	Directorate of Training
DPW	Directorate of Public Works
DRMO	Defense Reutilization Marketing Office
EA	Environmental Awareness
EAC	Emergency Action Center
ECAS	The Environmental Compliance Assessment System
EMO	Environmental Management Office
EPR	Environmental Program Requirements
EP&S	Engineering Plans and Support
EQCC	Environmental Quality Control Committee
ESRI	Environmental Systems Research Institute
FGS	Environmental Final Governing Standards, Germany
FORSCOM	Forces Command
FRG	Federal Republic of Germany
GIS	Geographic Information System
GUI	Graphic User Interface
HQDA	Headquarters Department of the Army
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
ISA	Interservice Agreement
ISR	Installation Status Report
ITAM	Integrated Training Area Management
LCTA	Land Condition Trend Analysis
LRAM	Land Rehabilitation and Maintenance
MACOM(s)	Major Command(s)
MAGIC	Military Activity GIS Interface Concept

MAP	Management Action Plan
MDEP	Management Decision Package
MGE	Modular GIS Environment
MILES	Multiple Integrated Laser Engagement System
MOUT	Military Operations on Urban Terrain
MWR	Moral, Welfare, and Recreation
NAF	Non-Appropriated Funds
NATO	North Atlantic Treaty Organization
OCONUS	Outside Contiguous United States
ODCSENGR	Office of the Deputy Chief of Staff, Engineer
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans
OMA	Operations and Maintenance
OPFOR	Opposing Force
OPRED	Operation Readiness
OPTEMPO	Operational Tempo
PLS	Planning Level Survey
PMR	Program Management Review
RTLP	Range and Training Land Program
RDB	Red Data Book
SA	Supplementary Agreement
SOFA	Status of Forces Agreement
SOS	Schedule of Services
SPOT	Satellie pour l'observation de la Terre
TM	Technical Manual
TRI	Training Requirements Integration
TSSDS	Tri-Services Spatial Data Standard
UNIX	Operating system developed by Bell Laboratories (an AT&T subsidiary)
USACERL	U.S. Army Construction Engineering Research Laboratory
USAEC	U.S. Army Environmental Center
USAREUR	U.S. Army Europe
USAWES	U.S. Army Waterways Experiment Station

GLOSSARY OF TERMS

ABG-75: "*Auftragsbautengrundsaetze - 1975*" (Principles for Contracting Construction Projects - 1975) is an agreement between the Federal Republic of Germany and the financing bodies, to include the United States, on the procedures to be followed by the financing bodies to accomplish construction within Germany.

Adverse Effect: Changes that reduce the quality of the natural environment or diminish the quality or significant value of archaeological resources, cultural resources, or property.

Carrying Capacity (Ecological): The maximum density of wildlife which a particular area or habitat is capable of carrying on a sustained basis without deterioration of the habitat.

Carrying Capacity (ITAM): The amount of training that a given parcel of land can accommodate in a sustainable manner with a reasonable and prudent level of maintenance and rehabilitation. The optimum capacity is a balance of usage, condition, and level of maintenance.

Check Dams: Structures built on ephemeral stream beds, in order to control the flow of sedimentation into surface waters, often associated with retention basins.

Chlorination: The application of chlorine to water, wastewater, or industrial wastes, generally for the purpose of disinfection.

Conservation: Wise management and use of natural resources to provide the best public benefits for present and future generations.

Contaminated water: Water that has been intruded by microorganisms, chemicals, wastes, or wastewater in a concentration that makes the water unfit for its intended use.

Edge Effect: The effect, generally favorable to wildlife, produced by the conditions existing where one habitat or cover type ends, and another one begins.

Endangered Species: Any species of flora or fauna, listed in Table 13-1 in the Environmental Final Governing Standards Germany, in a German state's Red List (*Rote Liste Deutschland)*, or designated in some other fashion by the governments of the United States or Germany whose continued existence is, or is likely to be, threatened and is therefore subject to special protection from destruction or adverse modification of associated habitat.

Environment: The natural and physical environment, excluding social, economic, and other environments.

Fauna: Animals collectively.

Floodplain: The lowland and relatively flat areas adjoining inland and coastal waters including at a minimum that area subject to a one percent or greater chance of flooding in any given year.

Flora: Plant life collectively.

Forest Management: The science, art, and practice of managing and using for human benefit the natural resources that occur on or in association with forest lands.

Habitat: The place where a plant or animal species naturally lives and grows, or the environment in which the life needs of an organism, population, or biological community are supplied.

Herbicide: An agent used to destroy or inhibit plant growth.

Improved Grounds: Acreage on which intensive maintenance activities are performed.

Integrated Pest Management: The use of all appropriate technology and management techniques to bring about pest prevention and suppression in a cost-effective and environmentally sound manner.

Inventory-Wildlife: Estimates of the populations of wild animals, by species, on an area at a given time, usually based upon some type of sampling procedure.

Management Plan: A document describing natural resources, their quantity, condition, and actions to ensure conservation and good stewardship.

Multiple Use: The integrated management of more than one land use to achieve the optimum use and enjoyment of natural resources while maintaining a balance of environmental qualities, ecological relationships, and aesthetic values.

Natural Resource: All living and inanimate materials supplied by nature that are of aesthetic, ecological, educational, historical, recreational, scientific, or other value.

Natural Resources Management: Action taken to protect, manipulate, alter, or manage environmental, human, and biological resources in harmony with each other to meet present and future human needs.

Outdoor Recreation Area: Land or water area with characteristics that make it suitable for one or more specific outdoor recreation activities. It does not, however, include athletic facilities such as ball fields and golf courses.

Outfall: The point or location where wastewater or drainage discharges from a sewer, drain or conduit.

Pest: Organisms (except for microorganisms that cause human or animal disease) that adversely affect the well being of humans or animals, attack real property, supplies, equipment or vegetation, or are otherwise undesirable.

Pesticide: Any substance or mixture of substances, including biological control agents, that may prevent, destroy, repel, or mitigate any pests; also any substance or mixture of substances used as plant regulators, defoliants, or desiccants.

Potable Water: Water that has been examined and treated to meet the proper standards and declared by responsible authorities to be fit for drinking.

Retention Basin: Structures built to retain storm water and other surface run-off water, in order to control sedimentation, often associated with check dams.

Runoff: Water from rain, snowmelt, or irrigation that flows over the ground surface to a stream, lake, pond, or underground aquifer.

Sediment: Solid material, such as silt, sand, and organic matter, that moves from its site of origin and settles to the bottom of a watercourse or water body. Excessive amounts of sediment can clog a watercourse and interfere with navigation, fish migration, spawning, etc. If disturbed, sediment can be re-suspended in the water column, where it contributes to turbidity.

Semi-improved Grounds: Areas on which periodic recurring maintenance is performed, but to a lesser degree than improved grounds.

Seibert Stakes: The U.S. Army uses these stakes, which are a standard length of 1.8-2 meters and a standard diameter of 8-10 cm and painted red and yellow, to mark wetlands, pipe crossings, recovering lands, and other environmentally sensitive areas. These stakes are named after a former garrison commander named Seibert in Hohenfels.

Sludge: The settable solids separated from liquids during processing or through deposition on bottom of streams or other bodies of water. A mixture of liquid and solids.

Surface Waters: Those waters continuously or occasionally flowing in beds, standing, or naturally flowing from springs.

State: The political subdivision referred to as *Land* in Germany.

Sustainable Use: Use of the land that meets the needs of the present generation without compromising those of future generations.

Threatened Species: Those plants and animals that are likely to become endangered within the foreseeable future throughout a significant portion of their ranges.

Unimproved Grounds: Acreage occupied by land on which no maintenance activities occur.

Wastewater Treatment Plant (WWTP): Any DoD or host nation facility designed to treat wastewater before its discharge to waters of the host nation and in which the majority of such wastewater is made up of domestic sewage.

Water Use: The removal or diversion of waters from surface waters: damming or lowering of surface waters; removal of solids from surface waters so that the condition of the water or its drainage is affected; introduction or discharge of substances into coastal waters; discharge of substances into the groundwater; removal, unearthing, drawing, and diverting or groundwater; damming, lowering, and conducting groundwater through facilities intended for these purposes; and measures that are likely to cause lasting or significant deleterious changes in the physical, chemical, or biological quality of the water.

Waters of The Host Nation: Surface waters including the territorial seas recognized under customary international law, including;
- all waters that are currently used, used in the past, or may be susceptible to use in commerce;
- waters that are or could be used for recreation or other purposes;
- waters from which fish or shellfish are or could be taken or sold;
- waters that are used or could be used for industrial purposes by industries;
- waters including lakes, rivers, streams (including intermittent streams) sloughs, prairie potholes, or natural ponds;
- tributaries of waters identified above.

NB. Waste treatment systems, including treatment ponds or lagoons, are not waters of the host nation. This exclusion only applies to human-made bodies of water that neither were originally waters of the host nation nor resulted from the impoundment of waters of the host nation.

Water Protection Area: An area established by a German state to protect public water supplies, supplement groundwater, or prevent harmful runoff of precipitation and flooding, as well as to prevent entry into the water of soil constituents or substances used to treat and fertilize plants. The state will publish a set of restrictions for each area designated applicable to all, including DoD components.

Wetlands: Areas inundated or saturated by surface water or groundwater at a frequency and a duration to support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

EXECUTIVE SUMMARY

(To be provided in the Final Report)

CHAPTER 1.0

INTRODUCTION

1.1 PURPOSE OF THE PLAN

This Integrated Natural Resources Management Plan (INRMP) has been prepared for the 417th Base Support Battalion (BSB) Würzburg, Germany in accordance with the Environmental Final Governing Standards (FGS) for Germany, Chapter 13 - *Natural Resources and Endangered Species* (DoD, March 1996). The primary purpose of this INRMP is to document the policies and desired future direction of natural resources management programs at the 417th BSB Würzburg. Implementing the INRMP ensures sustainable use of lands for military training and other mission activities.

1.2 OVERALL GOALS

Overall goals of the plan include:

- Supporting the operational mission of the 417th BSB Würzburg;
- Meeting stewardship requirements; and
- Enhancing quality of life.

1.3 MANAGEMENT PHILOSOPHY

This INRMP was developed under five main concepts:

- Sustainable use of military lands;
- Natural resources stewardship;
- Biodiversity protection;
- Ecosystem management; and
- Economic/cost savings aspects.

In order to achieve its missions and maintain readiness standards, the U.S. Army must have lands that are capable of supporting mission functions indefinitely into the future. Consequently, lands are one of the U.S. Army's most valuable assets. Sustainable use of these resources can be achieved through management programs that integrate training and other mission requirements for land use with sound natural resources management of the land.

Natural resources stewardship is the management of these resources with the goal of maintaining or increasing the resource's value indefinitely into the future. The stewardship goal of the U.S. Army is to manage all aspects of natural resources in such a way that multiple uses are compatible with each other. Multiple uses include, but are not limited to mission activities, outdoor recreation, aesthetic, forest management, and preservation.

Biodiversity is defined by U.S. Army Regulation 200-3 as the variety of life and its processes, including living organisms, the differences among them, and the communities and ecosystems in which they occur. Protecting and enhancing biodiversity is one overall goal of the U.S. Army. Biodiversity consists of many elements of the natural environment including indigenous ecological communities, native species and their associations, and ecosystem functions such as predation, grazing, nutrient cycling, and fire. Biodiversity is best measured by the variety of natural communities and the variety of natural functions that occur within and among these communities, rather than simply by the numbers of species present.

Management for maximum biodiversity helps to ensure ecosystem health, which in turn ensures sustainable use to accomplish military missions.

Ecosystem management is the tool that the U.S. Army uses to protect and enhance biodiversity and achieve sustainable use for military activities. This approach favors management that considers natural resources at a community or ecosystem level and de-emphasizes management at the single species level. The quality, integrity, and connectivity of the ecosystem is the overall goal in this approach, and it is assumed that within this broader scheme, individual species will prosper. This approach does not mean, however, that individual rare species are neglected. Rare species are important components of ecosystems and biodiversity. In addition, rare species are provided legal protection in many instances, and therefore must be considered in particular during project planning.

1.4 INSTALLATION POLICIES

The principle installation policies established to attain natural resources management goals at the 417th BSB Würzburg include:

- To maintain sustainable use of Army lands through the conservation of existing resources;
- To enhance the quality of life for residents by incorporating the conservation of natural resources into the planning process;
- To protect surrounding land uses from potential impacts from the military mission through monitoring of the natural resources and rehabilitation of problem areas;
- To reduce operational costs by using sound natural resource management practices in the on going maintenance of the facility; and
- To fulfill stewardship responsibilities through monitoring, protection, and enhancement of the existing natural resources.

Specific environmental protection policies include:

- U.S. Army and allied army personnel participating in training are required to read and understand the environmental awareness educational aids supplied by the installation;
- Vehicles shall remain on marked trails and predetermined route except when ordered otherwise during maneuver exercises. Unnecessary cross country movement of tracked and heavy wheeled vehicles is prohibited;
- Wheeled and tracked vehicles will not be operated in wooded areas unless specifically authorized by the appropriate authorities. Reforestation areas are off-limits to any vehicles and are surrounded by 'Seibert Stakes';
- Movement into off-limits areas is strictly prohibited. Observe restrictions on movement of vehicles in those areas designated on off-limit overlays and marked with 'Seibert Stakes'. Stay out of all drainage basins and drainage ditches;
- Prevent tracked vehicles from making locked tread turns or neutral steer maneuvering unless it is absolutely necessary;
- All personnel must be safety conscious at all times and understand and comply with appropriate safety regulations;
- Care will be taken to prevent the destruction of ant hills in forests, as these ants are managed by the Bundesforstamt for controlling tree damaging insects;
- Allow vehicles to cross major roads and ditches only at designated crossings;
- Plan and execute bridging operations only at suitable sites;
- Conduct movement into assembly or bivouac areas in vehicle columns to reduce damage to road shoulders and culverts;
- Do not build ground fires, cut trees, or damage foliage (i.e. nailing signs to trees);
- Do not cut new roads or parking areas;
- Do not dig trenches, ditches, survivability, or individual fighting positions unless authorized by Range Control;
- Firing at wildlife is prohibited;
- Do not spill fuel/oil or other hazardous products and
- Do not bury trash in the ground.

These policies are implemented in a variety of ways, for example:

- The road network is maintained to allow fast troop movement with very little accident risk;
- The eroded areas are reseeded on a continuous basis to prevent long-term damage; and
- Risky areas like steep slopes and protected areas are clearly marked for the safety of personnel and equipment.

1.5 MONITORING PROGRESS

The INRMP will be reviewed annually and revised as necessary by the Environmental Management Office (EMO) personnel to attain U.S Army stewardship goals. A major revision will be accomplished at least every 5 years. The initial plan will be signed by the BSB Commander and, through official channels, sent to USAREUR for approval. Only the initial plan and major revisions will be forwarded to USAREUR for approval (Department of the Army, 25 February 1995). The Environmental Quality Control Committee (EQCC) is responsible for the maintenance of the plan.

1.6 ORGANIZATION OF THE PLAN

This INRMP is organized into three volumes that are further divided into a total of 15 Chapters. Volume I includes general information that is applicable to the cantonment area and training area. Volumes II and III address specific management programs for the cantonment area and training area, respectively. The tables, figures, and photographs are numbered according to the Section in which they first appear. For example, if this Section had a table the number would be 1.6.1. References are listed in Appendix A1, Persons Contacted during the preparation of the plan are listed in Appendix B1. Each volume has separate appendices and is intended to be a stand-alone document.

The natural resource management programs for the training area have identified management goals designed to address management issues and concerns. The Project/Program Priorities section of each program are defined as Highest Priority, Important, or Less Important. The following definitions are according to the Draft Guidelines for Preparing Integrated Natural Resources Management Plans (USAEC, March 1997).

- The projects that have been classified as Highest Priority are those, which are needed in order to be in compliance with environmental regulations;
- Those projects that have been classified as Important are those that will directly benefit the military mission or which will significantly improve the quality of life at the installation; and
- Those projects classified as Less Important are those which would first be cut or will only be implemented if funding is available.

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CHAPTER 2.0

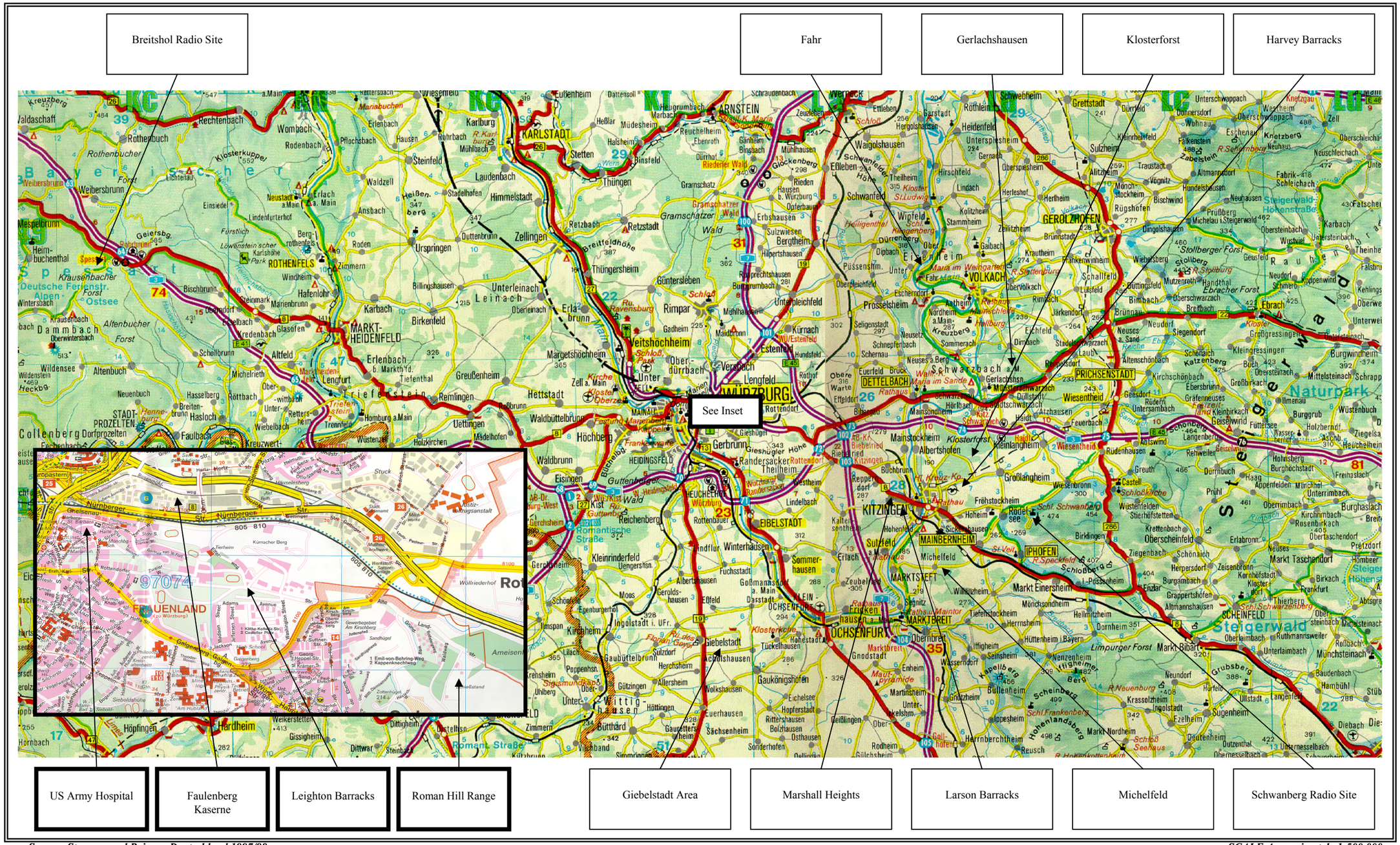
LOCATION AND ACREAGE

2.1 LOCATION AND LAND OWNERSHIP

The 417th BSB Würzburg consists of 14 locations including: Breitshol Radio Site; Fahr; Faulenberg Kaserne; Gerlachshausen; Giebelstadt Area; Harvey Barracks; Klosterforst (including Giltholz); Larson Barracks (including Larson LTA); Leighton Barracks (including Lincoln Family Housing Area); Marshall Heights; Michelfeld; Schwanberg Radio Site; Roman Hill Range and the U.S. Hospital in Würzburg. Apart from Harvey Barracks and Klosterforst all of the locations are geographically separated. The location of these sites are shown in Figure 2.1.1 The BSB is split into three Area Support Teams (ASTs), Würzburg, Kitzingen and Giebelsatadt and the parcels of land associated with each AST are detailed in Tables 2.2.1 and 2.2.2.

The Federal Republic of Germany (FRG) allows the 417th BSB Würzburg to be used as a military installation by the U.S. Army to fulfill their defense responsibilities within the North Atlantic Treaty Organization (NATO). The Supplementary Agreement (SA) to the NATO Status of Forces Agreement (SOFA) delineates the scope of U.S. authority within the installation boundaries. In brief, this authority entitles the U.S. forces to take the measures necessary to satisfactorily meet their defense responsibilities. The United States Army, Europe (USAREUR) has an obligation to act responsibly and effectively in the management and use of natural resources and lands under their administrative control.

FIGURE 2.1.1 417th BSB WÜRZBURG LOCATION MAP



Source: Strassen und Reisen. Deutschland 1997/98

SCALE Approximately 1:500,000

2.2 ACREAGE AND ACQUISITION

The present total acreage of the installation is 5,137.43 acres (2,079.09 hectares) based on data provided by Real Property and USAREUR (Holbrook, 2 March 1999). Installation lands are divided into the cantonment areas, which includes 2321.36 acres (939.44 hectares) and the training areas, which consist of 2816.07 acres (1,139.65 hectares). Tables 2.2.1 and 2.2.2 provide a summary of the various parcels of land that make up the 417th BSB. It should be noted that within this report the values detailed for Larson Barracks, include the adjacent training area, as there is insufficient clarity on where the cantonment area ends and the training area begins. When reference is made to Klosterforst this includes Gilthilz unless specified otherwise. Any reference made to Leighton Barracks will include Lincoln Family Housing Area.

TABLE 2.2.1

ACREAGE OF THE CANTONMENT AREAS

(For clarity values have only been given in hectares)

Locations	Acreage (Hectares)
AST Würzburg	
Breitshol Radio Site	0.98
Faulenberg Kaserne	12.72
U.S Hospital	5.62
Leighton Barracks	135.85
Sub Total – AST Würzburg	155.17
AST Kitzingen	
Harvey Barracks	248.29
Larson Barracks *	253.92
Marshall Heights	32.21
Schwanberg Radio Site	1.16
Sub Total - AST Kitzingen	535.58
AST Giebelstadt	
Giebelstadt Area	248.69
Sub Total - AST Giebelstadt	248.69
Total Cantonment Areas	**939.44**

* See note above detailed in 2.2.

TABLE 2.2.2

ACREAGE OF THE TRAINING AREAS

(For clarity values have only been given in hectares)

Locations	Acreage (Hectares)
AST Würzburg	
Roman Hill Range	8.21
Sub Total – AST Würzburg	8.21
AST Kitzingen	
Fahr	2.39
Gerlachshausen	5.36
Klosterforst	1,088.26
Michelfeld	35.43
Sub Total - AST Kitzingen	1,131.44
Total Training Areas	**1,139.65**

2.3 INSTALLATION HISTORY

Information regarding the history of many of the U.S facilities within the 417th BSB is not currently available. As a result, only the history of Leighton Barracks, Faulenberg Kaserne, and the U.S Hospital have been given below.

Leighton Barracks is named after Captain John A. Leighton, Commanding Officer, Company 'G', 10th Armored Infantry Battalion, 4th Armored Division who was killed in action on 18 July 1944. Captain Leighton was awarded the Silver Star posthumously for gallantry in action. Leighton Barracks is located on the heights to the east of the city of Würzburg. At the top of these heights is an area known as Gallows Hill where the city's criminals were executed on the side facing the city up until about 80 years ago. The barracks itself was the site of a model farm in the 18th century, whose existence is recorded by a monument at one corner of the Post Headquarters Building. The land served as an artillery range during the first half of the 19th century. Later, it served as a prison camp during the first world war. During that time, the level stretch of ground was also used as an airfield for the primitive flying machines at that time, claiming the lives of three early enthusiasts in air crashes. The German Luftwaffe took over the field during the Second World War and built a small air

base. During the last phase of the war the air base was destroyed in the 'scorched earth' tactics of the Third Reich. Some of the structures of the original air base survived and can be seen on Leighton Barracks today (see Photograph 2.3.1). American troops occupied the field on Easter, 1945, reconstructing the buildings and designating it as a prison camp for approximately 1000 captives. It was later used as a confinement center for displaced persons with criminal records, and returned to the German Government in February 1948. Leighton Barracks is presently the site of Headquarters, 1st Infantry Division which moved from Emery Barracks in 1956.

Photograph 2.3.1 Leighton Barracks. The buildings in this view indicate the history and past uses of Leighton Barracks.

Faulenberg Kaserne was built during the years 1876 and 1879. It housed the German 2nd Artillery Regiment for 40 years, which was later replaced by the 9th Bavarian Infantry Regiment 'Wrede'. Prior to and during the Second World War, units of the German 2nd Armoured Division were stationed at Faulenberg Kaserne. At the present time, Faulenberg Kaserne houses activities in support of the units stationed in the Würzburg area. These include the DPW, Special Service Warehouse, and other logistical support activities.

Faulenberg Kaserne is also contains the 98th ASG Headquarters which was officially activated on 16 October 1991, and assigned to V Corps.

The U.S. Hospital Würzburg is located on the northeast side of Galgenberg Hill and has the main entrance on Marianhillstrasse. The hospital was built between 1936-1937 as a German Army hospital but was soon incapable of accommodating the expansion of the Germany Army of the mid 1930's. On 11 November 1937, the hospital was named 'Standortlazarett Würzburg' and assigned to a Medical Detachment of the Sanitätsabteilung 15. A year later in November 1938 the hospital personnel were assigned to the Medical Corps of the newly formed 4th Panzer Division under the Sanitätsabteilung 40 headquartered in Würzburg. On 8 April 1945, the hospital became occupied by U.S. forces and became the 124th Evacuation Hospital which was replaced a year later by the 57th Field Hospital. In 1951 the hospital was reassigned and renamed the 10th Field Hospital. Soon after the hospital underwent a major refurbishment which lasted until 1952. The refurbishment consisted of several major projects including resurfacing all floors, repainting all ceilings and walls, rebuilding the attic space to house the Red Cross and library facilities, the addition of a new dining hall for patients and a chlorinated water system. In addition, a 120 seat theater for movies and stage plays was built as well as a separate access road for ambulances. The hospital is a six story building with approximately 1,200 rooms containing approximately 375,000 square feet of floor space and is situated on approximately 14 acres. Today it is the Headquarters of the USA MEDDAC Würzburg, and is named the 67th Combat Support Hospital (see Figure 2.3.2).

Photograph 2.3.2 Views of the U.S. Hospital. Top left: park and gardens on the back side of the Hospital. Top Right: front entrance. Below: back side of the U.S. Hospital taken from the roof of another building within the hospital complex.

2.4 ADJACENT LAND USES

Breitsol and Schwanberg Radio Sites are remote radio relay sites located in areas of approximately 1 hectare and the adjacent land use has therefore not been included.

Fahr, Gerlachshausen and Michelfeld are small remotely located training areas. Adjacent land use is mainly agricultural with several small settlements.

Faulenberg Kaserne, Leighton Barracks, Roman Hill Range and the U.S. Hospital are located either within or close to the City of Würzburg. Faulenberg Kaserne and the U.S. Hospital are both situated in urban areas with some commercial enterprises. This includes a car wash, recycling truck storage facility and Seimens near Faulenberg Kaserne. Roman Hill Range is located to the southeast of the City of Würzburg. This is a small site and adjacent land use includes: commercial forests; agricultural and residential areas. Adjacent land use to Leighton Barracks includes residential, agricultural, commercial forests and other commercial enterprises. To the southwest is Würzburg University complex which includes housing, a library and lecture halls, etc.

Harvey Barracks, Larson Barracks, Marshall Heights and Klosterforst are located either within the Town of Kitzingen or the greater metropolitan area of Kitzingen.

Harvey Barracks and Klosterforst are almost adjacent and have therefore been considered together. These sites are mostly located to the east of Straatsstraße 2271, but towards the northern end of Straatsstraße 2271 before it bisects the A3, Klosterforst extends to the west. To the north of Klosterforst is the A3 and to the south is Straatsstraße 2272. Not all of the area known as Klosterforst is available to the U.S. for training. The main part of Harvey Barracks and Klosterforst are bisected by the Straatsstraße 2272 with Harvey Barracks to the south and Klosterforst to the north.

To the west of Harvey Barracks between Straatsstraße 2272 and just south of Flugplatzstraße there is a commercial and industrial complex. There is another commercial and industrial complex (Gewerbegebiet Goldberg) to the east of Panzerstraße and to the south of Harvey Barracks. In-between the commercial and industrial complexes adjacent land use includes: agricultural; residential; an Office of the Agricultural Ministry and an Agricultural College; an office of the TÜV; an office of the Workers Welfare Association; a sports field and a fishing pond. The remaining land use adjacent to Harvey Barracks is mainly agricultural but to south there is a Materials Recycling Facility (Photograph 2.4.1).

Photograph 2.4.1 Recycling Facility. This facility is adjacent to Harvey Barracks and can been seen from the south side of the airfield.

Land use adjacent to Klosterforst includes: agricultural (Photograph 2.4.2), tree nurseries to the east of Tank Road (Photograph 2.4.3); commercial forests; the A3 to the north and the Central Post Office for the area to the west.

Photograph 2.4.2 Agricultural Land Use. This field is located adjacent to the Klosterforst LTA along Tank Road. This is typical of the agricultural land uses in the area.

Photograph 2.4.3 Tree Nursery. This nursery is adjacent to the Klosterforst to the north of the MOUT site. It is clearly visible from the main road that runs through the LTA.

Marshall Heights and Larson Barracks are located to the west of the main railway line, which runs through the Town of Kitzingen. These two location are almost adjacent and have therefore been considered together. Marshall Heights is the most northerly location and it is situated between Repperndorfer Straße to the north and Kaltensondheimer Straße (Straatsstraße 2272) to the south. Between Kaltensondheimer Straße (Straatsstraße 2272) and Larson Barracks there is a small residential and agricultural area.

Adjacent land use includes: a vineyard (Photograph 2.4.4), a New Apostolic Church to the north of Repperndorfer Straße; agricultural areas including vineyards and commercial forests to the west and to the southwest of Marshall Heights and to the west and south of Larson Barracks; and vineyards, residential areas, a kindergarten, sports field and sports hall (Florian-Geyer-Halle) to the east.

Photograph 2.4.4 View from Marshall Heights. The land use in this area is a mixture of vineyards, light industry and residential.

Giebelstadt is located in a predominantly agricultural area with several small settlements including the town of Geibelstadt.

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CHAPTER 3.0

MILITARY MISSION

3.1 OVERVIEW

The 417th BSB Würzburg is part of U.S. Army Europe/7th Army (USAREUR/7A) and the 98th Area Support Group (ASG). The 98th Area Support Group (ASG) provides command and control of assigned and attached units, Base Operations (BASOPS) support on an area basis, and conduct area operations in their geographical area designed to ensure physical security, manage terrain, control movement, provide damage control and recovery, and to provide direct combat service support to units located in or passing through the ASG's assigned area. On order, OPCON to Commander, 21st TAACOM to support deployment of tenants and/or transient units. The 98th ASG must be prepared to expand BASOPS to support contingency operations. On order, the 98th ASG will conduct additional missions as assigned by Commanding General, USAREUR. The mission of the installation is to allow rotational units to accomplish training objectives in tactically realistic environments in accordance with U.S. Army and NATO doctrine, under the published Rules of Engagement.

Specific mission objectives include the following:

- Facilitate common soldier task testing – land navigation training, perimeter setup, drivers training, etc.;
- Marksmanship training using WEAPONEER systems, Shoot/Don't Shoot Stress Trainer, Multipurpose Arcade Combat Simulator, etc.;
- Support company-level tactical training for field artillery, engineer, infantry, and Combat Support/Combat Service Support units with Multi Integrated Laser Engagement System (MILES);
- Provide additional training support to all units in the USAREUR footprint through military operations urban terrain (MOUT) (see Figure 3.1.1);

- Check point/Road block and refueling operations in support of Bosnia;
- Provide facilities to engineers for mine laying and other countermobility operations and breaching;
- Enhance host nation attitudes and cooperation;
- Limit negative impact on the installation and Federal Republic of Germany (FRG) community environments; and
- Provide desired quality of life for all permanently and temporarily assigned soldiers/personnel and family members.

Photograph 3.1.1 MOUT Site at Klosterforst. The MOUT site is located near the Range Control Office and adjacent to the Grenade Practice Course.

3.2 NATURAL RESOURCES NEEDED TO SUPPORT THE MILITARY MISSION

The primary natural resource needed for the military mission is an area of uninhabited open land that provides realistic training conditions. The soils and vegetation need to be robust enough to withstand maneuvers, while topography and water resources must be varied enough to test the equipment and vehicles. The landscape needs to represent conditions that soldiers are likely to encounter in a real battle situation in order to facilitate realistic and effective training.

The following consequences could occur if natural resources that are needed to support the mission are left unmanaged:

- Degradation to quality of life standards;
- Loss of training acreage;
- Creation of safety hazards;
- Decreased tactical maneuverability;
- Increased maintenance costs to training units; and
- Loss of vegetation and wildlife, undermining Host Nation support of U.S. military presence.

3.3 EFFECTS OF THE MILITARY MISSION ON NATURAL RESOURCES

The military mission of the 417th BSB Würzburg has a variety of effects on natural resources. The installation has continuously served as a U.S. Army training area since 1948. Consequently, land use and management practices at the installation are vastly different than the surrounding area, which primarily consists of agriculture lands, commercial forests, and urbanized areas. During fifty years of military use, the area has not been subjected to fertilizer and pesticide use, or other negative impacts of development. Soils are generally shallow, sandy and highly erodable. These characteristics make installation soils susceptible to impacts from repetitive training activities, especially tracked vehicle maneuvers.

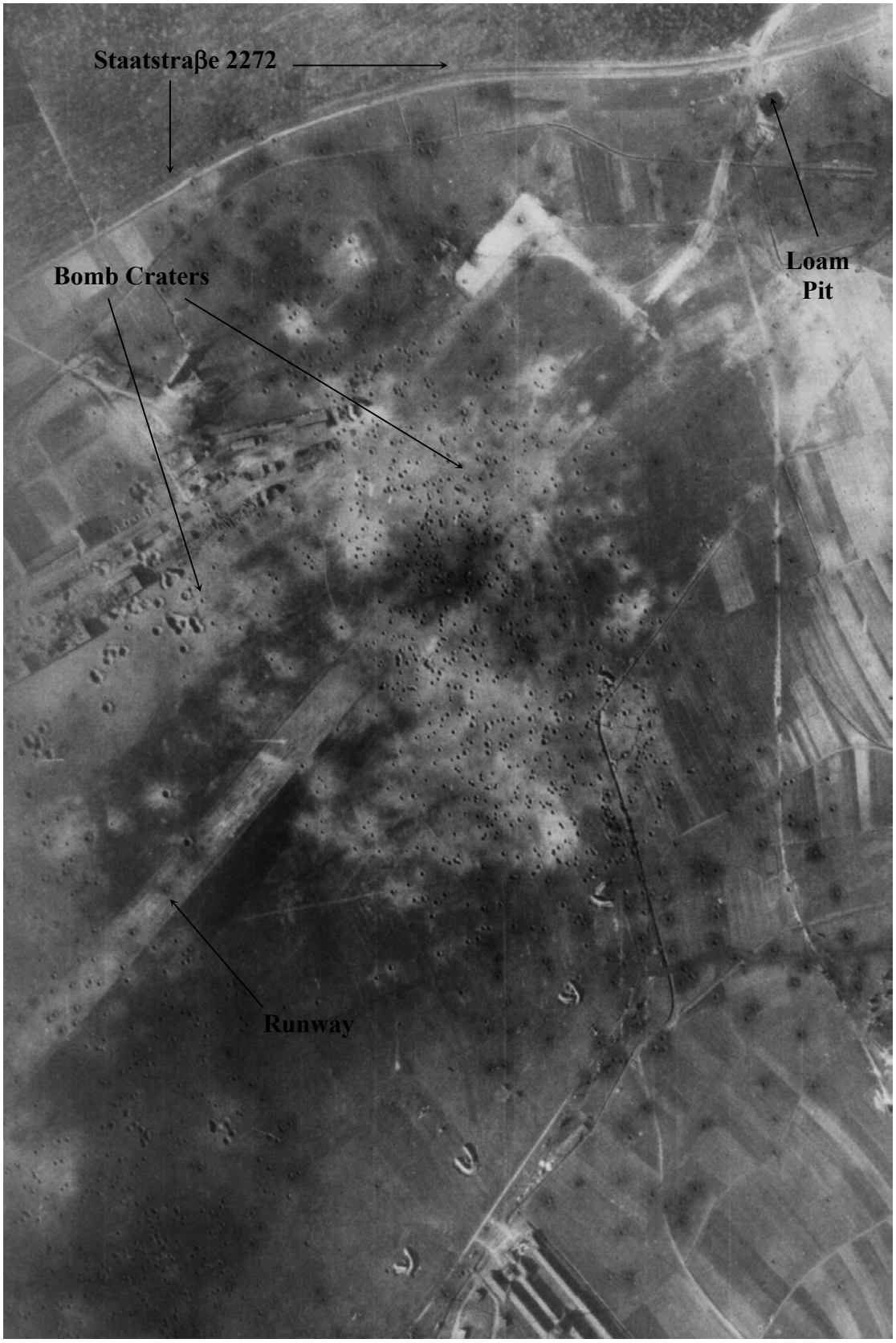
Disturbance of vegetation and the soil profile can lead to soil erosion and dust problems. Repetitive movement of heavy vehicles results in soils compaction, reduced permeability, increased storm water runoff, and increased erosion. If left unmanaged, soil erosion can render lands unsuitable or less realistic for training and create potential hazards to units. In addition, since facilities contained in the 417th BSB had military uses prior to the U.S. forces the effects of those uses can still impact the natural resources in the present day. For example, the air field at Harvey Barracks was used by the German Luftwaffe prior to and during the Second World War. After bombing raids by the Allies, the craters were filled up with debris and covered with soil (see Photograph 3.3.1).

3.4 IMPACTS OF NATURAL RESOURCES ON THE MISSION

Natural resources have the potential to affect the mission at the 417th BSB Würzburg primarily by limiting areas that are suitable for training. For example, forested areas are under management of the Bundesforstamt, the Straatsforstrevier, Public and Private owners and tracked vehicle training is generally restricted in these areas. Training is also limited in other environmentally sensitive areas and for safety reasons. For example, the ant hills in Klosterforst limit training in those areas.

3.5 MISSION CHANGES AND FUTURE MISSION IMPACTS ON NATURAL RESOURCES

Future changes in mission related activities are detailed in the 417th BSB Würzburg Master Plan (FY97-03). A prioritized project list for Financial Year (FY) 00 is detailed in Section 4.5.



Photograph 3.3.1 Aerial Photo circa 1945 of Harvey Barracks. All of the bomb craters shown on the photo were eventually filled with debris and covered with soil.

CHAPTER 4.0

FACILITIES

4.1 OVERVIEW

The 417th BSB Würzburg is the largest BSB within the 98th Area Support Group (ASG) and it comprises 5,137.43 acres (2,079.09 hectares). The BSB is split into three Area Support Teams (ASTs), Würzburg, Kitzingen and Giebelstadt, which between them have a total of 14 locations. There are 9 cantonment areas totaling 2,321.36 acres (939.44 hectares) and 5 training areas 2,816.07 acres (1,139.65 hectares). Tables 2.2.1 and 2.2.2, pages 21 and 22 provide a summary of the parcels of land that make up the 417th BSB.

The cantonment areas provide a range of facilities including: administrative, housing, warehouse, maintenance, and quality of life/community support facilities and some examples are listed in Table 4.2.1.

The training areas provide numerous facilities including:

- A MOUT site;
- A land navigation course;
- A grenade practice course;
- A confidence course;
- A Tank Crew and a Bradley Crew Proficiency Courses;
- Nuclear biological, and chemical facilites;
- A vehicle recovery area;
- Several bivouac areas; and
- Several ranges and other marksmanship instruction facilities.

The permanent population of the installation, according to the Commanders Brief (no date), is 16992 including: 6025 active duty; 6845 family members; 460 retirees; 1221 U.S. civilians; 1693 local nations, and 748 contractors and AAFES.

4.2 FACILITIES AND TRANSPORTATION SYSTEM

Due to force protection, at the enclosed cantonment areas, only one entrance and exit gate is open. This leads to a build up of traffic around these locations during peak commuting hours.

Table 4.2.1 summarizes the types of facilities provided at each location and the transportation systems. Breitshol and Schwanberg Radio Sites are early warning radio relay sites located in small, enclosed areas. These sites do not have transportation systems.

TABLE 4.2.1

FACILITIES AND TRANSPORTATION SYSTEMS

Locations	Facilities and Transportation Systems
	AST Würzburg
Breitshol Radio Site	This location provides a radio relay site.
Faulenberg Kaserne	This location provides administrative buildings and warehouse facilities. For example, Headquarters for the 98th ASG, 106th Finance Battalion and 69th Signal Battalion, EMO, and Real Property are all located at Faulenberg Kaserne. There is a cobbled stoned road network with many car parks and most of the road network is a one way system.
U.S. Hospital	This location consist of the largest U.S. Army Hospital in Europe and is the Headquarters of USA MEDDAC Würzburg 67th Combat Support Hospital. There is a paved road network system with car parks.
Roman Hill Range	This location provides military training facilities and details are given in Chapter 3.

FACILITIES AND TRANSPORTATION SYSTEMS (con't)

Locations	Facilities and Transportation Systems
Leighton Barracks	This location provides administrative, housing, warehouse, maintenance and quality of life/community support facilities. For example, Headquarters 1st Infantry Division (1ID), Company Grade and Officer's grade housing, one of the largest PX's in Europe, Community Bank and Credit Union, and several schools are all located at Leighton Barracks. There is a paved road network system with car parks.
	AST Kitzingen
Fahr	This location provides military training facilities and details are given in Chapter 3.
Gerlachshausen	This location provides military training facilities and details are given in Chapter 3.
Harvey Barracks	This location provides administrative, housing, warehouse, maintenance, and quality of life/community support facilities and military training facilities. For example, outdoor recreation, community church, paint ball and post office are located at Harvey Barracks. There is a paved road network with car parks, a runway and a railway line. Part of the road system consists of narrow one way streets.
Klosterforst	This location provides military training facilities and details are given in Chapter 3.
Larson Barracks	This location provides administrative, troop housing, warehouse, maintenance and quality of life/community support facilities and military training facilities. For example, Headquarters 17th Signal Battalion, library, community bank, autocraft shop, and outdoor swimming pool are located at Larson Barracks. There is a paved road network with some cobble stones, car parks and a helipad. Details on the military training facilities provided on the adjacent training area are given in Chapter 3.
Marshall Heights	This location provides family housing, schools and .quality of life/community support facilities. For example, youth services and elementary school. There is a paved road network with car parks.
Michelfeld	This location provides military training facilities and details are given in Chapter 3.
Schwanberg Radio Site	This location provides a radio relay site.
	AST Giebelstadt
Giebelstadt Area	This location is shared with the Bundeswehr. Administrative, warehouse, maintenance and quality of life/community support facilities are provided. For example,. the quality of life facilities include a bowling ally, autocraft shop and outdoor swimming pool. There is a road network with car parks and a runway.

4.3 WATER SUPPLY AND WASTEWATER TREATMENT

Potable water is purchased from local water suppliers (Table 4.3.1) and is delivered to the sites as German Specified Water (GSW). Water is abstracted from a series of wells located throughout the region. The responsibility for maintaining the wells, associated facilities and water supply falls to the local suppliers. The Directorate of Public Works (DPW) is responsible for ensuring that drinking water quality standards are maintained in accordance with Chapter 3 of the FGS.

The quantity of water consumed within a given period varies depending on the season, total number of vehicles washed, the number of construction projects, and the number of people located at each site. The total volume of water used during 1998 was approximately 975,479m^3 (Thal, 10 February 1999).

The current water supply appears adequate to meet existing needs. There are two points of note regarding water quality:

- Generally the water has a category 4 rating (DIN 2000 and 2001) for hardness which leads to problems with pipe corrosion.
- Potable water is supplied to GSW standard which means that it is possible, for example, to have a nitrate concentration of 50mg/L but the U.S. limit is 45mg/L.

TABLE 4.3.1

WATER SUPPLIERS AND QUANTITY USED

Location	Water Supplier	Volume Used 1998 (m^3)
	AST Wurzburg	
Breitshol Radio Site	Water not supplied	N/A
Faulenberg Kaserne	Stadtwerke Wü GmbH	51,565
U.S. Hospital	Stadtwerke Wü GmbH	47,178
Leighton Barracks	Stadtwerke Wü GmbH	325,560
Roman Hill Range	Gerbrunn	N/A
	AST Kitzingen	
Fahr	Water not supplied	N/A
Gerlachshausen	Water not supplied	N/A
Harvey Barracks	Licht – Kraft – und Wasserwerke Kitzingen GmbH	107,774
Klosterforst	Water not supplied	N/A
Larson Barracks	Licht – Kraft – und Wasserwerke Kitzingen GmbH	162,150
Marshall Heights	Licht – Kraft – und Wasserwerke Kitzingen GmbH	221,030
Michelfeld	Water not supplied	N/A
Schwanberg Radio Site	Water not supplied	N/A
	AST Giebelstadt	
Giebelstadt Area	Water purchased from STOV	60,222

Reference: Thal, 10 February 1999.

Collection and treatment of domestic and industrial wastewater and storm water is summarized in Table 4.3.1.

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TABLE 4.3.2

WASTEWATER TREATMENT

Location	Wastewater Treatment and Storm Water Management	Discharge Limits
AST Würzburg		
Breitshol Radio Site	N/A storm water seeps away.	
Faulenberg Kaserne	Combined domestic, industrial and storm water collection system, which discharges to the Würzburg City wastewater treatment plant.	9.5 pH 25°C
U.S. Hospital	Combined domestic, industrial and storm water collection system, which discharges to the Würzburg City wastewater treatment plant.	9.5 pH 25°C
Leighton Barracks	Combined domestic, industrial and storm water collection system, which discharges to the Würzburg City wastewater treatment plant. In a heavy storm event water discharges to the Kuernach and there are no discharge limits.	9.5 pH 25°C
Roman Hill Range	Combined domestic, industrial and storm water collection system, which discharges to the Gerbrunn City wastewater treatment plant.	9.5 pH 25°C
AST Kitzingen		
Fahr	N/A storm water seeps away.	
Gerlachshausen	N/A storm water seeps away.	
Harvey Barracks	Combined domestic and industrial wastewater collection system, which discharges into the Kitzingen City wastewater treatment plant. Storm water is collected separately by a series of storm water retention basins before it discharges into the Kitzingen City system.	9.5 pH 25°C
Klosterforst	N/A storm water seeps away.	
Larson Barracks	Combined domestic and industrial wastewater collection system, which discharges into the Kitzingen City wastewater treatment plant. Storm water is partially collected with the wastewater and partially by a series of storm water retention basins.	9.5 pH 25°C
Marshall Heights	Combined domestic, industrial and storm water collection system, which discharges to the Kitzingen City wastewater treatment plant.	9.5 pH 25°C
Michelfeld	N/A storm water seeps away.	
Schwanberg Radio Site	N/A storm water seeps away.	
AST Giebelstadt		
Giebelstadt Area	Combined domestic, industrial and storm water collection system. Discharges to the STOV wastewater treatment plant.	9.5 pH 25°C

4.4 WASTE MANAGEMENT

4.4.1 Solid Waste

Solid waste is sorted on post into 14 categories. The waste is collected by contractors and taken for disposal (Table 4.4.1). There is a different contractor for each of the AST. Waste, which can not be recycled or reused is sent for incineration at the incinerator/cogeneration plant located in Würzburg City.

TABLE 4.4.1

SOLID WASTE COLLECTION (Total FY 98)

Category	Tonnage (1998)
Glass	115.48
Paper/Cardboard	1,352.79
Metal Cans	199.30
Metal (Steel)	259.16
Aluminum	0.00
Wood	482.44
Construction Debris	1,861.56
Bio Waste	247.80
Tires	10.80
Batteries	0.00
Yellow Bag	135.80
Other (Non Food)	386.87
Other Metals	19.25
Refuse	8,639.50

Reference: Thal, 10 February 1999.

4.4.2 Hazardous Wastes

Hazardous wastes are amassed at designated collection points before being sent to the DRMO in accordance with the Hazardous Waste Management Plan (5 April 1996).

4.4.3 Landfills

During World War II Harvey Barracks was bombed quite heavily (Photograph 3.3.1). Data collected over the years suggests that many of the bomb craters have been used as landfills for debris left over after the bombings (Koss, 27 January 1999). There is no active program for identifying these sites but the following are examples of what has been identified during construction projects.

- Landfill A: At this location 12 underground gasoline pipelines were found.
- Landfill B: As can be seen from the photographs this location was originally a pit which has been filled. Over the years bricks, asphalt and other industrial debris have been found on the surface (Koss, 27 January 1999). Prior to this area being bombed there was paint shop for military vehicles located nearby.

4.5 PROJECTED CHANGES IN FACILITIES

Projected changes in facilities are amended to meet the requirements of the mission and are therefore not fixed. There is an on-going facility improvement program and projects are detailed in the BSB Master Plan. For example Harvey Barracks is undergoing extensive remodeling. Prioritized projects for Financial Year 00 include (Justice, 5 February 1999):

- Reconstruct the Litter Bearers Obstacle Course at Klosterforst. The 67th Combat Support Hospital, Wüzburg, uses the facility during the annual sponsorship of Expect Field Medical Badge (EFMB) qualification. Medical personnel also use it throughout the year to sustain their litter bearing skills. The existing structures have deteriorated to a degree that renders them unsafe for use. The nearest EFMB course is located in Schweinfurt 36 miles away.
- Upgrade Range 4 – Harvey Barracks Range Complex. The project includes: Installation of barriers to control access to the range; Construction of a concrete pad and overhead cover for bleachers; Installation of electrical power source in the ammunition issue hut; and installation of light source and fixtures to support night operations. The purpose for this project is to enhance range safety, and the comfort

and morale of soldiers who use the range, and the staff that operate it.

- Upgrade Bradley Crew Proficiency Course (BCPC) at Klosterforst – Project No. KAY 00141-8. Replace badly deteriorated control tower and install a metal frame with concrete floor to enhance observation and control during training. Air Defense Artillery units uses the BCPC as the gate firing Tables VI through VIII at the Major Training Area (MTA).

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CHAPTER 5.0

NATURAL RESOURCES AND CLIMATE

5.1 SETTING

The 14 parcels of land that make up the 417th BSB Würzburg are situated in the city of Würzburg itself and in the adjacent counties of Würzburg and Kitzingen in Lower Franconia, an administrative district of the state of Bavaria. The 14 locations include: Breitshol Radio Site; Fahr; Faulenberg Kaserne; Gerlachshausen; Giebelstadt Area; Harvey Barracks; Klosterforst; Larson Barracks; Leighton Barracks; Marshall Heights; Michelfeld; Schwanberg Radio Site; Roman Hill Range and the U.S. Hospital in Würzburg (see Figure 2.1.1). All of the sites lie on the edges of or adjacent to the geographical region known as the Main River Triangle. This area belongs to the Lower Triassic layers of the Schichtstufenland and derives its name from the unique course that the Main Valley takes on its way from Bamberg in the east. Rather than taking the direct western route, the river bends southward at the town of Schweinfurt for about fifty kilometers, passing Kitzingen and the surrounding sites until it reaches the town of Ochsenfurt. The Main then turns towards Würzburg in the northwest and continues to its former latitude, thus completing the triangle.

This huge valley, carved into the shelly limestone bedrock, includes locations such as Faulenberg Kaserne, Leighton Barracks, the U.S. Hospital, the facilities at Fahr and Gerlachshausen, and parts of Harvey Barracks. The region formed by this valley is referred to as the Middle Main Valley. The surrounding areas are predominantly agricultural and are considered to be the source of the best farmland in Southern Germany. The plains stretching east are known as Marktheidenfelder Platten and contain the Roman Hill Range, Marshall Heights, and Larson Barracks. The Giebelstadt Area is situated on the Ochsenfurter and Gollachgau plains, which stretch southward. The plain called Steigerwaldvorland, which stretches from the Main Valley to the east, includes Michelfeld, the major part of Klosterforst, and parts of Harvey Barracks. The Schwanberg Radio Site lies to the east of

Steigerwaldvorland, on the summit of the forest-covered mountainside of the Steigerwald.

Breitshol Radio Site is situated in the heart of the Spessart just off of the A3 Autobahn near the exit Rohrbrunn and Bundesstraβe 8. The area encompasses about 1 hectare of lawn and contains a radio unit. The geology is from the Middle Triassic Bunter called 141 Sandsteinspessart.

5.2 CLIMATE

The 417th BSB Würzburg is located in the transition zone of the Atlantic and Continental climatic regimes. The Odenwald, Spessart, and Rhön Mountains in the west and northwest form a barrier for Atlantic influence, blocking western winds and rain clouds. With the protection of these mountains, the Main Valley and surrounding plains are influenced by the warmest and driest climate in Bavaria. The region is considered part of the Mainfranken climate district, which is characterized by a continental climate tendency with dry, hot summers and comparably cold winters. The average annual variation in air temperature in this climate district is between 0°C and 22°C. In the winter months, minimum temperatures of less than -2°C are rare and snow accumulations of more than 10 cm occur less than 10 days per annum. The average annual precipitation at Würzburg is 602 mm (Bayerisches Klimaforschungsverbund, 1996) which is the least amount received at any weather station in Bavaria. The 30-year averages of annual precipitation and temperature data recorded at the Würzburg weather station are given in Table 5.2.1 and 5.2.2.

TABLE 5.2.1

MEAN MONTHLY PRECIPITATION (1961-1990)

		MEAN MONTHLY PRECIPITATION (mm)											
LOCATION	**Altitude (MSL)**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
Würzburg Station	268	43	39	45	47	55	72	54	57	43	42	49	56

TABLE 5.2.2

MEAN MONTHLY TEMPERATURE (1951-1980)

		MEAN MONTHLY TEMPERATURE (°C)											
LOCATION	**Altitude (MSL)**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
Würzburg Station	268	-0.3	1.0	4.6	8.8	13.2	16.6	18.2	17.5	14.2	9.2	4.2	1.0

Reference: Bayerisches Klimaforschungsverbund (1996)

5.3 TOPOGRAPHY

The parcels of land that make up the 417th BSB Würzburg are mainly situated in the southeastern suburbs of Würzburg and in the vicinity of Kitzingen. The topography at the locations of each installation is highly variable. Table 5.3.1 provides the elevation ranges for these locations. . Elevations are given as distances above mean sea level (MSL).

TABLE 5.3.1
LOCATION ELEVATION

Locations	Range in Elevation	
	(m above MSL)	(ft above MSL)
AST Würzburg		
Breitsohl Radio Site	500-585	1,640-1,918
Faulenburg Kaserne	187-192	613-630
U.S. Hospital	240-250	787-820
Leighton Barracks	225-273	738-895
Roman Hill Range	285-301	935-987
AST Kitzingen		
Fahr	195	637
Gerlachshausen	188	617
Harvey Barracks	190-205	623-672
Kloserforst	188-228	617-715
Larson Barracks	236-279	774-915
Marshall Height	210-255	688-836
Michelfeld	220-235	722-771
Schwanberg Radio Site	470	1542
AST Giebelstadt		
Giebelstadt Area	288-301	945-987

In addition, brief topographic and geographic descriptions of the installations associated with the 417th BSB Würzburg are provided. Leighton Barracks is located on the hilltop and northern slope of the Galgenberg between the city of Würzburg and the suburb of Gerbrunn. Elevations in these areas range from 273 meters (895 feet) on the southern boundary, to approximately 225 meters (738 feet) in the northeastern corner. In the valley below Leighton Barracks is where Faulenburg Kaserne is located at elevations between 187 meters (613 feet) in the southwest and 192 meters (630 feet) at the northeastern boundary. West of Leighton

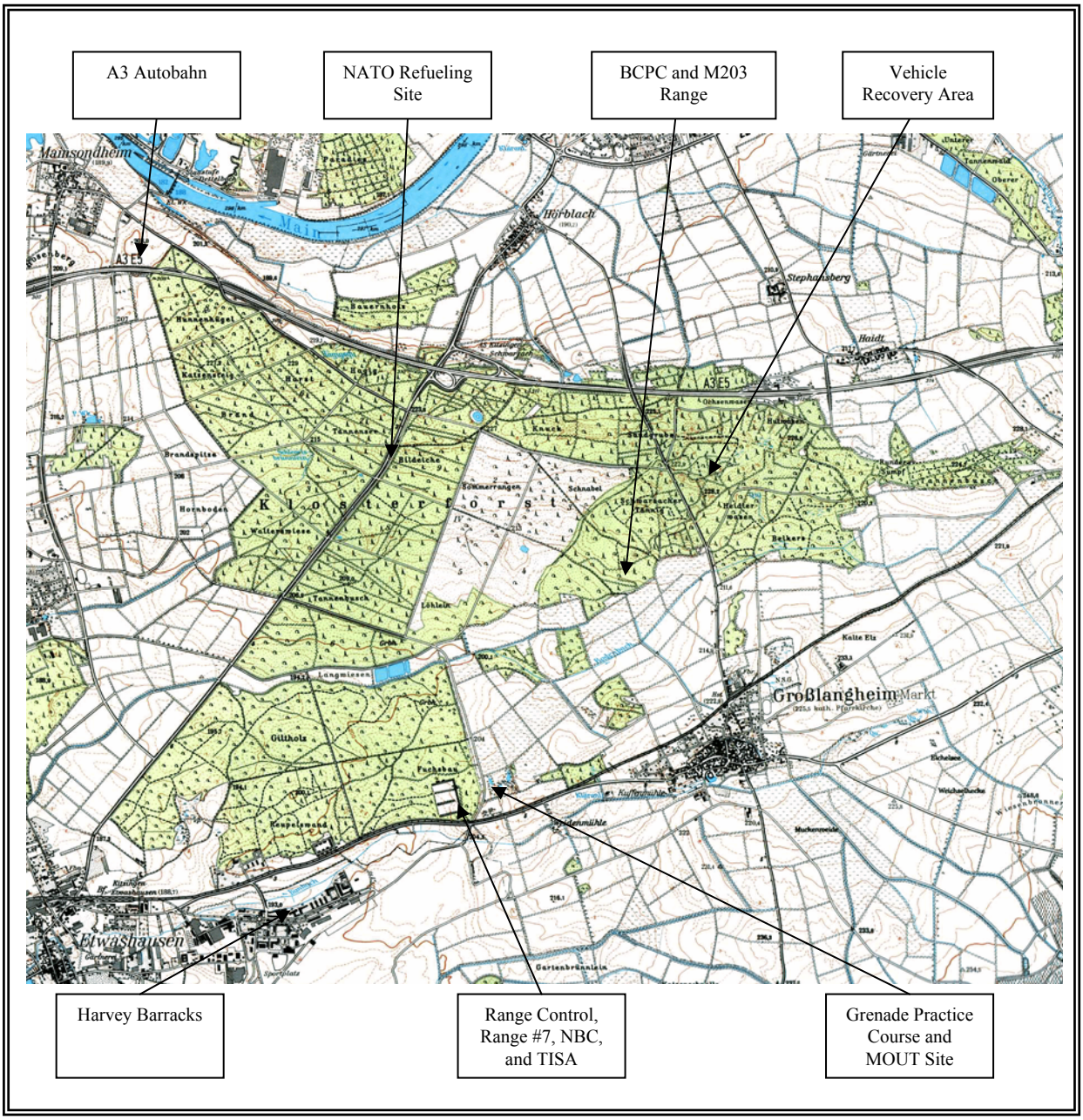
Barracks is the U.S. Hospital, which is situated on the northern slope of Mönchberg at elevations of approximately 240 to 250 meters (787 to 820 feet).

Klosterforst training area, including Giltholz, is situated between the railway in the south and the highway A3/E5 in the north. Elevations increase from approximately 188 meters (617 feet) in the southwest to 228 meters (715 feet) in the area north of Großlangheim (see Figure 5.3.1). The training area of Michelfeld is located to the southeast of Michelfeld at elevations between 220 to 235 meters (722 to 771 feet). Located east of the village of Giebelstadt, the Giebelstadt Area sits on a plateau at elevations ranging from 288 meters (945 feet) at its eastern border to 301 meters (987 feet) in the northwest. The flightline is located at 297 meters (974 feet). South of Schloß Schwanberg, the Schwanberg Radio Site sits at the western edge of the Schwanberg plateau at about 470 meters (1542 feet). Gerlachshausen and Fahr Training Areas are located near the villages along the Main River at approximately 188 meters (617 feet) and 195 meters (637 feet), respectively. The exact location of Breitshol Radio Site is unknown but it is located in the heart of the Spessart between Gross Heckberg in the south, with an elevation of 469 meters (1,538 feet), and Geiersberg in the north with an elevation of 585 meters (1,918 feet).

Roman Hill Range is situated on the plateau east of the valley of Gerbrunn at elevations that range between 285 and 301 meters (935 to 987 feet), increasing from west to east. Harvey Barracks are situated east of Etwashausen, rising from elevations of about 190 meters (623 feet) in the east, to approximately 205 meters (672 feet) in the west. West of Kitzingen, the cantonment areas of Larson Barracks and Marshall Heights cover two hills (see Figure 5.3.2). Elevations across the housing area decrease from 255 meters (836 feet) at the western boundary to approximately 210 meters (688 feet) in the east. At Larson Barracks and the adjacent training area, elevations range from 279 meters (915 feet) at the northwestern boundary to approximately 236 meters (774 feet) in the southeastern corner.

FIGURE 5.3.1

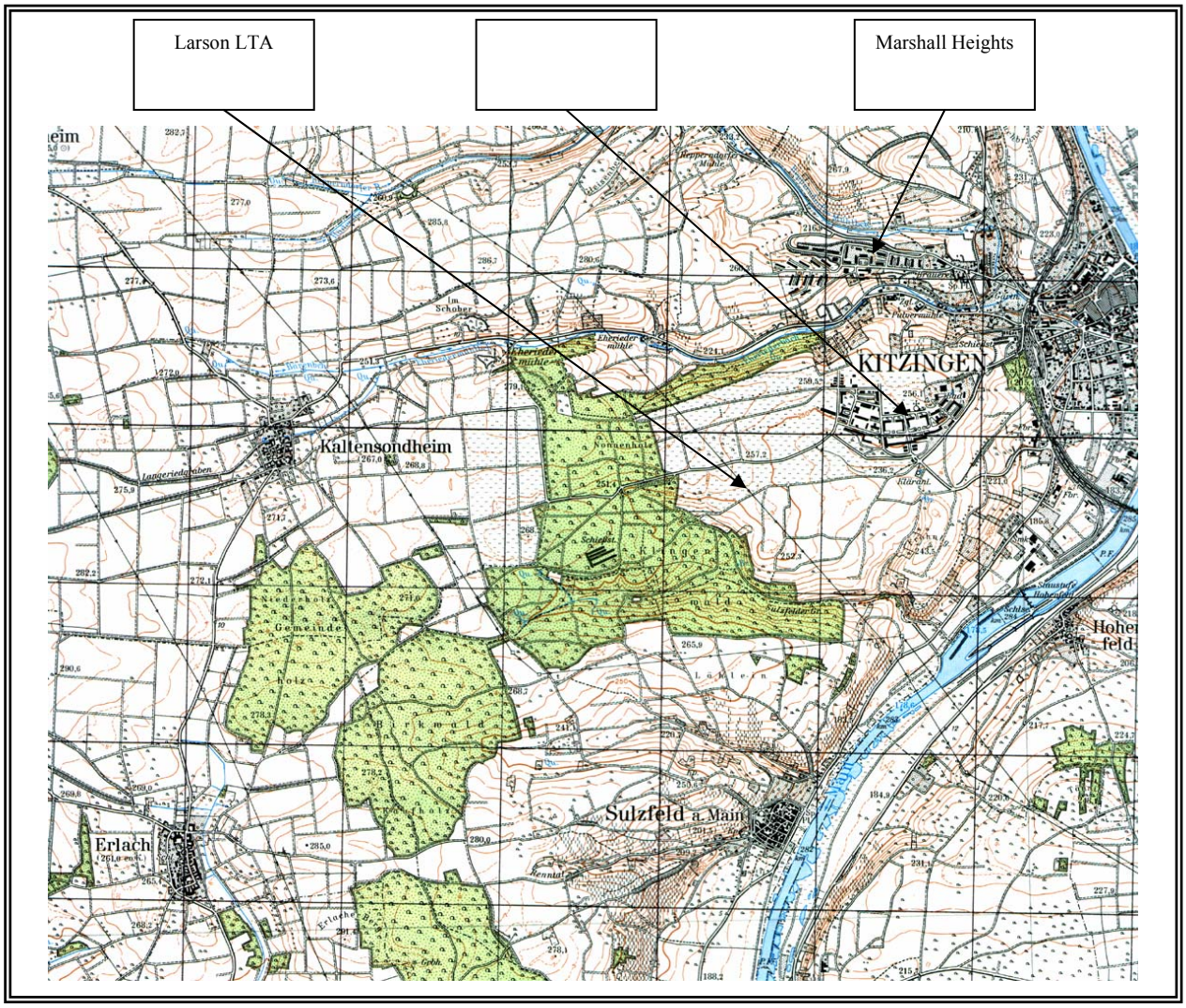
TOPOGRAPHY OF KLOSTERFORST



Source: Lamdesvermessungsamt *Scale: Approximately 1:100,000*

FIGURE 5.3.2

TOPOGRAPHY OF LARSON BARRACKS MARSHALL HEIGHTS AREA



Source: Lamdesvermessungsamt *Scale: Approximately 1:100,000*

5.4 GEOLOGY

A geological area called the Schichtstufenland encompasses the installations of the 417th BSB. This area is generally characterized by Triassic strata of Bunter (Buntsandstein), shelly limestone (Muschelkalk), Keuper, Jurassic (Jura), and Cretaceous (Kreide) sediments that were deposited in the Germanic Basin (Deutschen Becken) during the Mesozoic Era. Erosion and tectonic events at the Rhine Valley Fault resulted in a sequence of mountain ridges formed from the most resistant Triassic layers. Although most of the top layer of Cretaceous sediments has been eroded, the Spessart, which consist of Bunter strata, the Steigerwald, which consists of Upper Keuper sediments, and the 'Jura,' which consists of Jurassic layers, can be distinguished from west to east on the landscape.

Most of the installations are located in the depression between the Spessart and the Steigerwald. This depression consists of shelly limestone and Lower Keuper strata that contain non-resistant limestone, claystone, and clastic sediment sequences. The plateau formed by these sediments is carved by the Main River. During the Diluvium period, the area received large deposits of eolic loess. Eolic and terrassic sands were also deposited onto the flood plains of the Main River near Kitzingen.

Leighton Barracks, Faulenberg Kaserne and the U.S. Hospital are located in an area characterized by fractured limestone layers of the Upper Shelly Limestone (Oberer Muschelkalk). Faulenberg Kaserne is reportedly located within a major fault system that strikes northwest. The 1:25,000 scale geological map of this area shows a 120m vertical dislocation along the fault line that separates strata of the Middle Limestone in the southwest from strata of the Upper Limestone in the northeast. A number of smaller faults parallel this large fault. Layers of eolic sand are also apparent on the entire area of Faulenberg Kaserne and parts of Leighton Barracks. Giebelstadt is located on top of an elevated plain of Triassic Keuper sediments. The main strata are covered by a Loess layer, with an average thickness of several meters. The Ashlar Sandstone at its bottom resembles the main aquifer, and the groundwater level is more than 10 meters below the surface.

The underlying strata of Harvey Barracks and Larson Barracks consists of the Lower Keuper. These sediments consist of clastic sand, clay, and calcareous layers that overlay the Upper Limestone of the Uffenheimer Facies. Eolic sands and terrassic gravel of the Pleistocene lie above the Triassic sediments. The same strata characterize the training area of the Klosterforst, although the northern part contains eolic sand dunes of both Pleistocene and younger alluvial origin (see Figure 5.4.1 and 5.4.2 taken from the Geology Map of Bavaria, Bayerische Geologische Landesamt, 1967).

The 'Steigerwald' mountain ridge, where the Schwanberg Radio Site is situated, is characterized by a Middle Triassic Keuper sandstone facies called 'bubble sandstone' ('Blasensandstein'). "Bubble sandstone derives its name from its high content of clay inclusives (Koss, 1999).

5.5 SOILS

The soil types found in the vicinity of the installations of the 417th BSB have developed from the various parent materials of limestone, clay, and to a lesser extent, dolomites and sandstone of the Upper Shelly Limestone and Lower Keuper. Loess and eolic sand deposited during the most recent glacial period, as well as diluvial terrace sands and gravel, have also contributed to the variety of soil textures present in the region. Soil textures include clays, loams, marls, sandy loams, loamy sands, and sands.

In exposed regions, humus-carbonate soils have developed from a mix of residual limestone loam and marls and loess loam (Rendzinen). Less exposed and plain areas have developed predominantly brown soils. Such soils tend to show podzolizing, depending on their sand content. The Podzol is poorly developed on the young quarternary sand dunes in the Klosterforst. Soils in the vicinity of Klosterforst are also gleyed along streams and pseudogleyed in areas with high ground water levels (see Figure 5.5.1 and 5.5.2 taken from the Soil Map of Bavaria, Bayerische Geologische Landesamt, 1959).

FIGURE 5.4.1

GEOLOGY OF KLOSTERFORST AND HARVEY BARRACKS

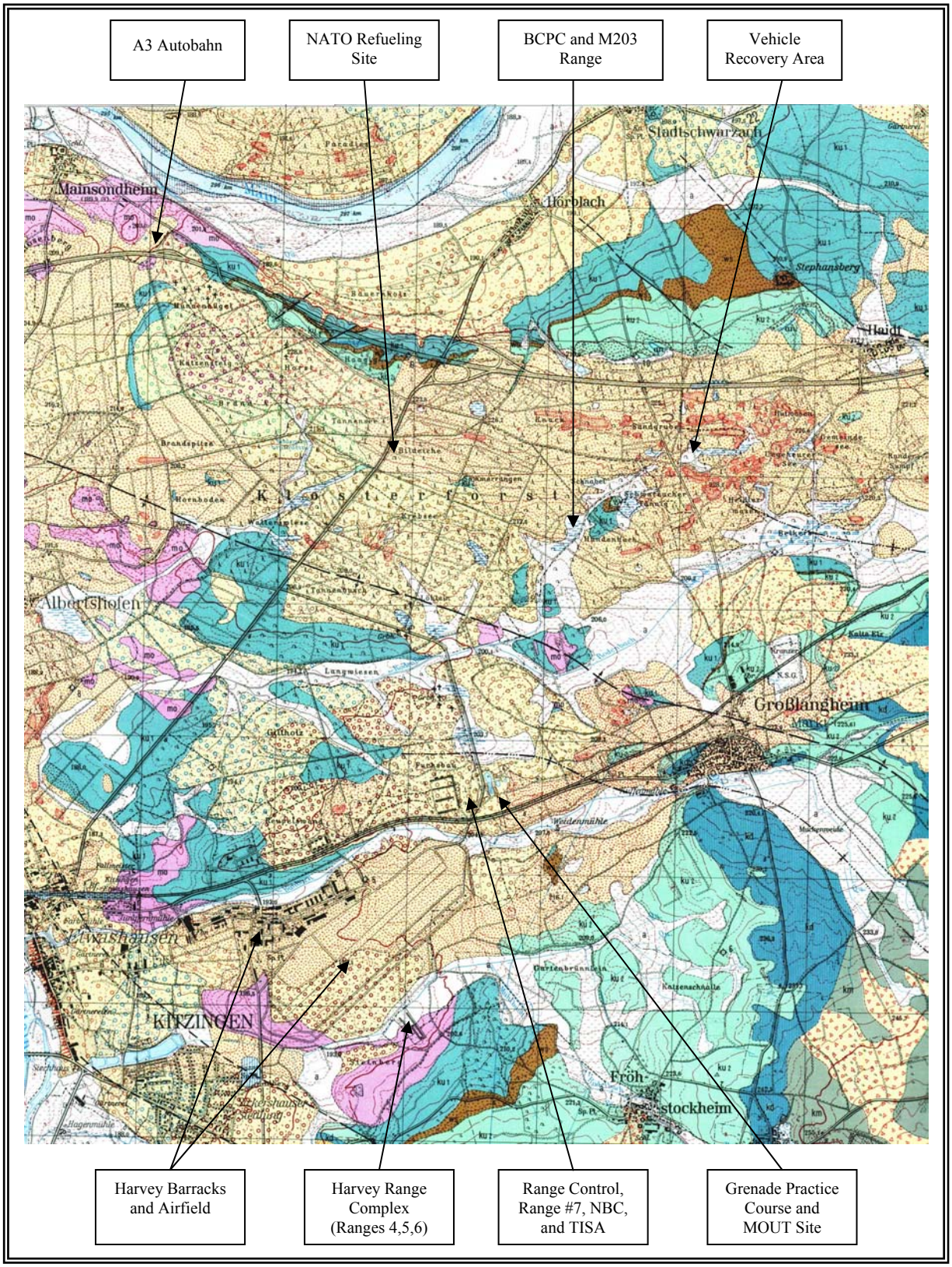


FIGURE 5.4.2

GEOLOGY KEY

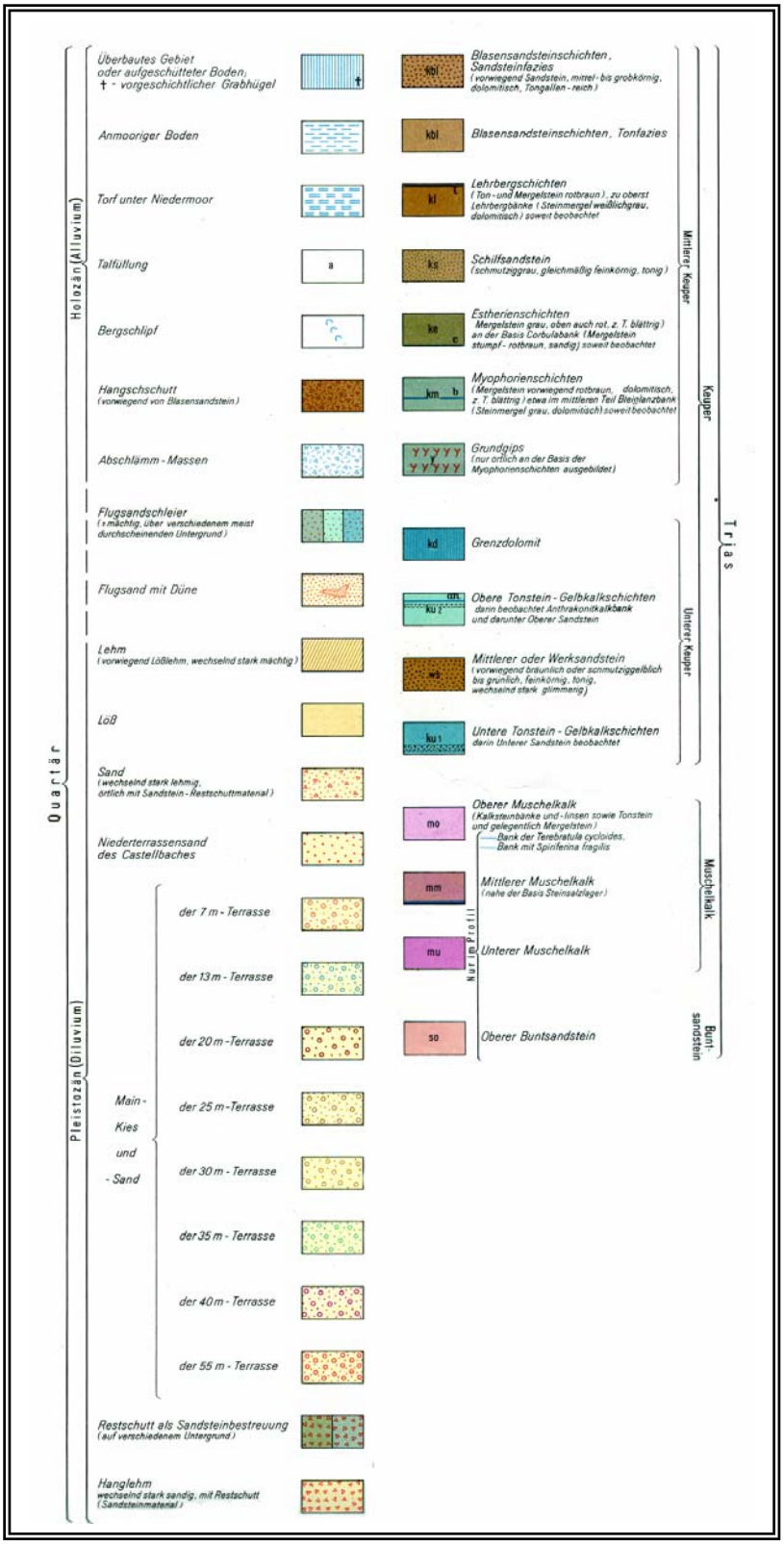


FIGURE 5.5.1

SOIL MAP OF THE KLOSTERFORST AND HARVEY BARRACKS

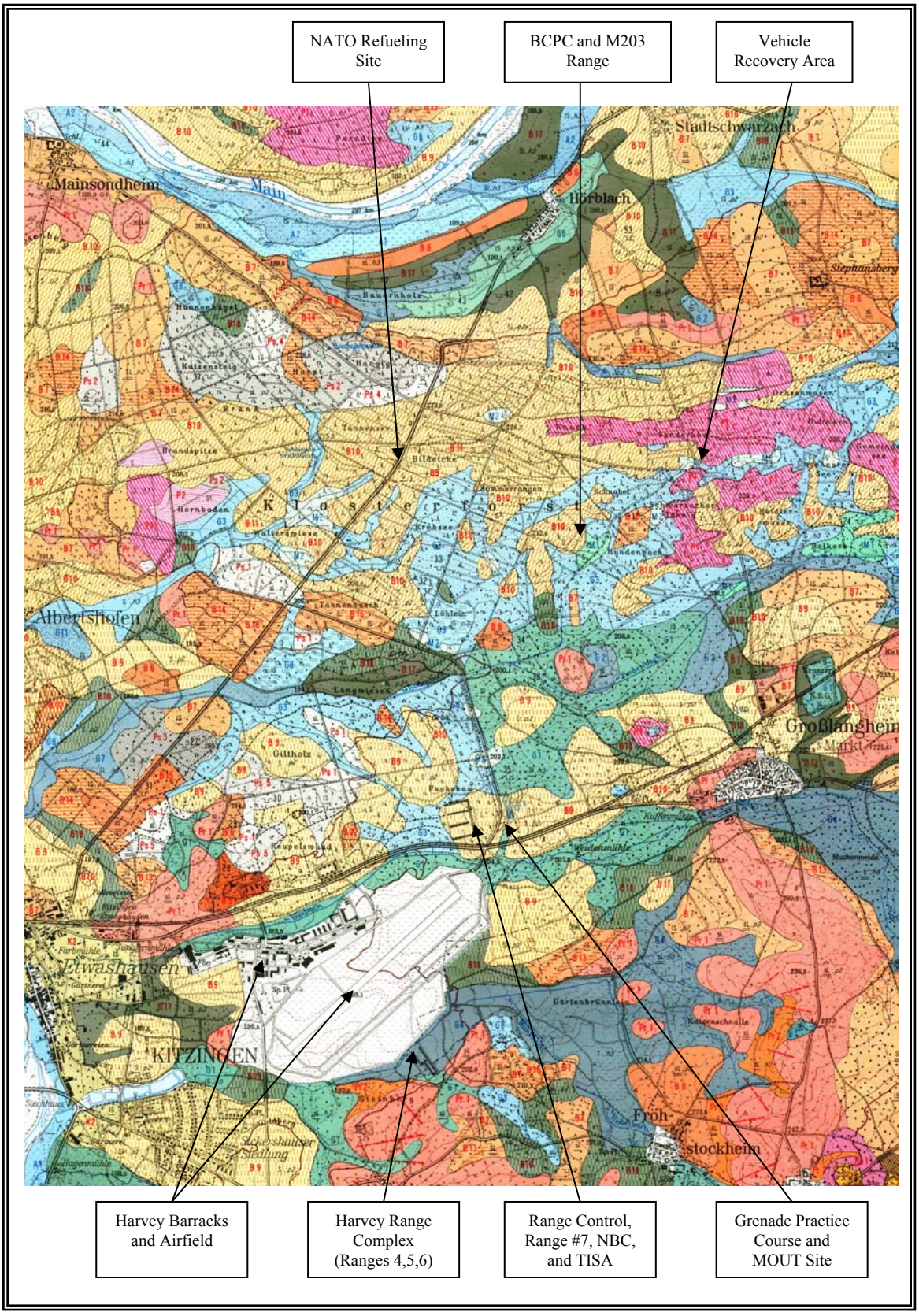
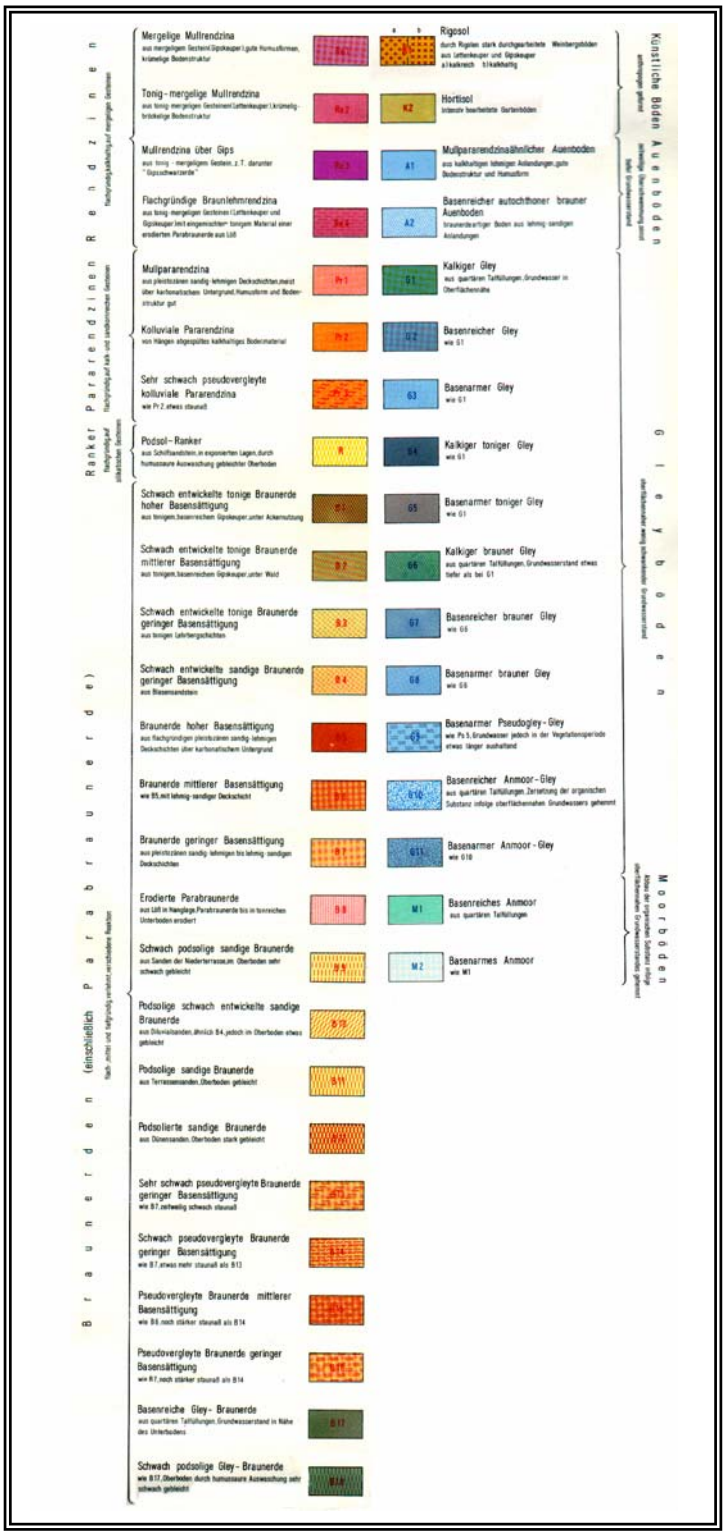


FIGURE 5.5.2

SOILS KEY



5.6 PETROLEUM AND MINERALS

Currently, none of the installations support active mineral extraction operations. However, a historic loam pit at the northeastern boundary of Harvey Barracks has been filled (see Photograph 3.3.1). In addition, the sand dune area in the eastern part of the Klosterforst contains partially refilled sand pits.

5.7 WATER RESOURCES

5.7.1 Surface Water

There are no surface water resources located on Faulenberg Kaserne, the U.S. Hospital, Leighton Barracks, Roman Hill Range, Harvey Barracks, Larson Barracks, Marshall Heights, or Giebelstadt Area. Close to these locations there are a number of streams and the Main River. Details are provided in Table 5.7.1. In Klosterforst, there are a number of temporary puddles and water ditches, wetland areas, ponds, and a stream, and the Rodenbach. The Rodenbachand several large ponds run through the Klosterforst from east to west, cutting off Giltholz from Klosterforst proper.

TABLE 5.7.1
SURFACE WATER RESOURCES

Locations	Surface Water Resources
	AST Würzburg
Breitsohl Radio Site	There are no surface water resources at this location.
Faulenberg Kaserne	There are no surface water resources at this location. The Main River is located approximately 3km to the West.
U.S. Hospital	There are no surface water resources at this location. The Main River is located approximately 2km to the West.
Leighton Barracks	There are no surface water resources at this location. The Main River is located approximately 3km to the West.
Roman Hill Range	There are no surface water resources at this location. The Main River is located approximately 3km to the South West.

SURFACE WATER RESOURCES (con't)

Locations	Surface Water Resources
	AST Kitzingen
Fahr	The location is situated by the bank of the Main River.
Gerlachshausen	The location is situated by the bank of the Main River.
Harvey Barracks	There are no surface water resources at this location. The Bimbach stream splits just before the Eastern boundary of the barracks, and then runs West along the northern boundary edge towards Etwashausen, before discharging into the Main River. The Rödelbach stream runs along the southern boundary before discharging into the Main River as well. The Main River is approximately 2km from the barracks.
Larson Barracks	There are no surface water resources at this location. To the North of Larson Barracks is the Eherieder Bach Stream. The Main River is approximately 1¼km from Larson Barracks.
Marshall Heights	There are no surface water resources at this location. There are two streams close to this location, the Repperndorfer Mühlbach to the North, and the Eherieder Bach to the South. Both streams run East before discharging into the Main River. The Main River is approximately 1¼km from Marshall Heights.
Michelfeld	There are no surface water resources at this location.
Schwanberg Radio Site	There are no surface water resources at this location.
	AST Giebelstadt
Giebelstadt Area	There are no surface water resources at Giebelstadt. There are two streams located to the North West, Dreibrunnenbach and Langenwiesenbach, and one to the South East, Mückenbach.

5.7.2 Groundwater

The main aquifer in Würzburg is located in the karstic layers of the Middle Limestone, resulting in a ground water depth of approximately 60 to 70m at Leighton Barracks and 6 to 9m at the Faulenberg Kaserne. The ultimate discharge point is the Main River. At Giebelstadt, the main aquifer is the Ashlar Sandstone at the bottom of a loess layer with its mean thickness of several meters. The ground water level is more than 10m below surface. At Harvey Barracks and Larson Barracks, the Triassic Lower Keuper sediments are covered by quarternary eolic sand deposits and terrassic gravel. Purched water forms a shallow moving water table directly under the surface at different locations. At Harvey Barracks, the ground water level is at about 5 to 6m below surface.

5.7.3 Natural Wetlands

At Klosterforst, the ground water reaches the surface at several locations in open and forested areas. This is due to impermeable layers of the Lower Keuper underneath the thin top layer of quarternary eolic and terrassic sand and gravel. The ground water level periodically rises during autumn and winter, and forms puddles, ponds, and streams many of which are only temporary and disappear in summer. In addition, the banks of the Rodenbach were expanded in the 1930's in an attempt to provide drainage for the whole area.

5.8 ECOLOGICAL COMMUNITIES AND BIOTOPES

This section describes existing vegetation types and ecological communities at the locations associated with the 417th BSB, as well types and communities that may have occurred prior to human influence. The term potential natural vegetation (pnV) is used to describe the ecological community that is expected to develop if human influence was completely removed. Determination of pnV is a standardized process and is based on several factors such as physical location, geology, climate, aspect, and exposure. The pnV for a given site can be used to assess the extent that human influences have changed native plant communities.

5.8.1 Potential Natural Vegetation (pnV)

The expected pnV depends largely upon edaphic conditions. On loamy residual soils of Limestone, Lower Keuper, or Loess, the expected pnV primarily consists of beech (*Fagus sylvatica*) forest communities. *Carici-Fagetum* communities are expected to dominate south-exposed locations and hilltops with acidic tendencies without reaching true *Luzulo-Fagetums.* On base-rich loess plains, the expected pnV consists of *Milio- Fagetum*, and on northern slopes, thermophilic *Hordelymo-Fagetum* would be expected to dominate.

Dry, hot areas in the vicinity of Kitzingen are considered to be part of a zonal oak forest region by several experts. Mature forests in the basins of Windsheim, to the southeast of Kitzingen, and the Grabfeld, to the northeast of Schweinfurt, provide regional examples of this community type. Edaphic, rather than climatic factors, are believed to contribute to the development of vegetative communities in the region (Meyer, 20 January 1999). Beech forests in the vicinity of Kitzingen are stressed by low precipitation, periodic changes in groundwater levels, and the clay soils of the Lower Keuper, allowing oaks and hornbeams to coexist or even replace them. Scotch pine (*Pinus sylvestris*) is not likely to occur naturally on extremely dry and poor sand dunes, whereas oak forests and *Potentillo albae-Quercetum* communities thrive on the comparably thin layers of eolic sands with high groundwater levels. Areas with flowing ground and surface water will support *Carpinion* or *Alno-Ulmion* formations like ash-rich Stitchwort-Hornbeam forests (*Stellario-Fagetum*), as well as ash forests, on the wettest and most inundated sites. Alder stands (*Alnion glutinosae*) and *Carici elongatae-Alnetum* communities are also likely to form in wet areas (Suck & Bushart, 1995; and Goldstein, December 1997).

5.8.2 Existing Vegetation

The cantonment areas including: Breitsohl Radio Site Faulenberg Kaserne, Giebelstadt, Harvey Barracks, Larson Barracks, Leighton Barracks, Marshall Height and Schwanberg Radio Site and, consist primarily of infrastructure and facilities such as buildings, parking lots, and paved roads. Tree groups, solitary trees, and maintained grass areas dominate the cantonment areas listed above. In addition, orchards are present at Leighton Barracks, poor grasslands and a deciduous forest are present at Larson Barracks, apple orchards grow on the southern boundary of Giltholz, and poor grasslands are found in the vicinity of the runway at Harvey Barracks.

Roman Hill Range constists mainly of maintained grassland and Michelfeld is located in an oak forest. Klosterforst training area includes the following forested areas:

- Deciduous forest stands of mature oak, ash and alder, which approximate the pnV;
- Cultivated pine stands and oak-pine mixed forests; and
- Mature vegetation along the boundaries of surrounding farmland.

The non-forested central area was created for military training by extensive clear-cutting in the 70's. It is covered by successional stages from bare ground to grassland, broom heaths, ponds, hydrosere vegetation, wetland-like ponds, creeks, bogs, and willow-shrub communities. Interesting pioneer and successional communities have developed in dry and wet areas of sandy soil.

The Klosterforst contains an outstanding habitat complex for most of the species groups that have already been considered and are likely to be recorded in the future. For example, Klosterforst is one of the most species-abundant sites known in Bavaria for forest bees and moths.

Information is absent with regard to grasslands at Roman Hill Range, Larson Barracks, and at the Harvey flightline, as well as for orchards at Leighton Barracks, forests at Larson Barracks, and the forest near the training area of Michelfeld. Gerlachshausen and Fahr training areas consist of maintained river banks for floating vehicles and are generally devoid of vegetation.

Ecological communities were classified during the survey of the Klosterforst (Ecosystem Mapping and Field Survey. Klosterforst Training Area and Harvey Barracks Training Area, 1997).

5.9 FLORA

Information about the flora of the 417th BSB has been obtained from the Threatened and Endangered Species Study Report for Harvey Barracks (GE33V) and Klosterforst Training Area (GE45L). Additional descriptions of the Bavarian Biotope Recording for the Landesamt für Umweltshutz (LfU), including lists of species, are available for parts of the installations on the topographical map of Kitzingen. However, species numbers are not

provided and very little additional information on the flora of the 417th BSB areas exists.

As previously stated in this report, the following locations are considered to be cantonment areas: Breitsol Radio Site, Faulenberg Kaserne, Giebelstadt Area, Harvey Barracks, Larson Barracks, Larson Barracks, Leighton Barracks, Marshall Heights, Schwanberg Radio Site and the U.S. Hospital. Vegetative cover at these locations is limited to maintained grasslands, solitary trees and is not very likely to be unique. Species present in these areas are likely to be the common and widespread plant species of maintained grassland and housing areas. However, surveys of the fruit varieties in the old orchards at Leighton Barracks, the poor grasslands and deciduous forests at Larson Barracks, the apple orchards on the southern boundary of Klosterforst (Giltholz), and the poor grasslands in the vicinity of the runway at Harvey Barracks may yield valuable floral information.

As previously stated in this report, the following locations are considered to be training areas: Fahr, Gerlachshausen, Klosterforst, Michelfeld and Roman Hill Range. Surveys of Roman Hill and Michelfeld training areas would be valuable since the number of plant species at these installations is unknown.

The training area at Klosterforst consists of both open and forested areas. The report of an Ecosystem Mapping and Field Survey in 1997 lists a total of 470 plant species at Klosterforst and Harvey Barracks, including unproved recordings of the Biotopkartierung. Species distributions for forested and open areas cannot be determined. The report includes an overview of the evaluation criteria for the forest mapping method ***(****Wald Biotop Inventur****)*** and the percentages for each category in which the recorded units have been estimated. However, there is no comparison to the vicinity or any statement about the importance of the recorded area for the particular species groups. The results indicate that the Klosterforst may be of statewide to nationwide importance for vascular plants. The other facilities are expected to be of local or regional importance, but the database is insufficient to determine their true ecological value. No information on the occurrences of lichens and mosses is available for any facility.

5.10 FAUNA

Information about the fauna of the 417th BSB installations has been obtained from the Threatened and Endangered Species Study Report for Harvey Barracks and Klosterforst Training Area (Ogden Umwelt und Energie System GmbH, 1995 and 1997) An overview of the available data on animal species is provided in Tables 5.10.1 and 5.10.2. Very little information about the fauna of the 417th BSB areas, other than these records, is available. The Bavarian Biotope Recording for the LfU is available for the parts of the installations included on the topographical map of Kitzingen. However, this source focuses mainly on vegetation and vascular plant species and gives little information about animal species.

TABLE 5.10.1

FAUNA IN THE CANTONMENT AREAS

Locations	Available Data
Breitsohl Radio Site	No data available.
Faulenberg Kaserne	No data available.
Giebelstadt	Secondary data of birds (7), mammals (1), bird survey (1).
Harvey Barracks	No data available.
Larson Barracks	Secondary data: birds (10), amphibians (1).
Leighton Barracks	No data available.
Marshall Height	No data available.
Schwanberg Radio Site	No data available.
U.S. Hospital	No data available.

TABLE 5.10.2

FAUNA IN THE TRAINING AREAS

Locations	Available Data
Fahr	No data available.
Gerlachshausen	No data available.
Klosterforst	Surveys on birds (105), reptiles (3), amphibians (12), grasshoppers (23), butterflies (48), butterflies & moths (560), xylobiontic beetles (28), bats (5), forest bees (258), and dragonflies (24) which are listed at the literature table.
Michelfeld	No data available.
Roman Hill Range	Survey of Locusts (7), amphibians (-), dragonflies (-), and birds (14).

The training area of Klosterforst consists of open and forested areas. The report on an

Ecosystem Mapping and Field Survey at the Klosterforst and the training areas of Harvey Barracks in 1997 contains lists of animal species, including secondary data collections. Species distributions for forested and open areas cannot be determined. No statement about the importance of the recorded area is included for the particular species groups. The results indicate that the Klosterforst may be of statewide to nationwide importance for animal life, in general. The other facilities are expected to be of lower importance, but the database is insufficient to determine their ecological value, except for Roman Hill Range. In contrast, the extensive database available for the Klosterforst provides most of the species recordings listed in the table below.

TABLE 5.10.3
NUMBER OF SPECIES PER ANIMAL GROUP

Animal Group	Number of Species
Amphibians	9
Reptiles	3
Bats	5
Mammals excl. Bats	4
Birds	105
Butterflies & Moths	560
Dragonflies	28
Forest Bees	258
Beetles	402
Locusts	20
Snails & Mussels	20
Total	**1394**

5.11 THREATENED AND ENDANGERED SPECIES

A list of threatened and endangered species is published for each state within Germany. Species identified on this so-called 'Red List' are categorized according to their rarity as follows:

I Species that are rare to the area usually having their breeding grounds outside the area.

I* Endangered. - Only breed in this area.

0 Extinct species.

1 Species threatened by extinction.

2 Severely endangered species.

3 Endangered species.

4 Potentially endangered species.

Pr Protected by German law Bundesartenschutzverordnung. Some species, although not on the red list, are protected by law. These laws regulate the collection, import, export, and trade of the protected animals and plants.

Tables 5.11.1 and 5.11.2 give an overview of the results and available data on threatened and endangered species investigations split by cantonment and training areas.

TABLE 5.11.1

RESULTS OF TES SURVEYS FOR THE CANTONMENT AREAS

Locations	Available Date
Breitsohl Radio Site	No T & E species data available.
Faulenberg Kaserne	No T & E species data available.
Giebelstadt Army Airfield	Birds (7) and mammals (1).
Harvey Barracks	No T & E species data available.
Larson Barracks	Secondary data: birds (10), amphibians (1) and plants (1).
Leighton Barracks	No T & E species data available.
Marshall Height	No T & E species data available.
Schwanberg Radio Site	No T & E species data available.
U.S. Hospital	No T & E species data available.

TABLE 5.11.2

RESULTS OF TES SURVEYS FOR THE TRAINING AREAS

Locations	Available Date
Fahr	No T & E species data available.
Gerlachshausen	No T & E species data available.
Klosterforst	Surveys on birds (44 T&E species), reptiles (2), amphibians (7), grasshoppers (13), butterflies & moths (152), beetles (23), bats (5), forest bees (110), and dragonflies (13) which are listed at the literature table.
Michelfeld	No T & E species data available.
Roman Hill Range	Survey of locusts (7), amphibians and dragonflies, and birds (14).

Table 5.11.3 presents the combined results of threatened and endangered species surveys. The majority of T&E species data have been collected at the Klosterforst, except for secondary data collections at Larson Barracks and Klingenwald**,** Giebelstadt Army Airfield, Leighton Barracks, and Roman Hill Training Area (Ogden Umwelt und Energie System GmbH, 1995 and 1997).

TABLE 5.11.3

RESULTS OF TES SURVEYS

Group	Red Data Book Species	Category 0, 1, and 2 # Red Data Book Species	Importance
Vascular Plants	54	7	State
Amphibians	8	4	Regional
Reptiles	2	0	Regional
Bats	5	?	Regional
Birds	44	21	State
Butterflies	152	29	International
Dragonflies	13	5	Regional
Forest Bees	110	40	State
Beetles	23	7	Regional
Locusts	13	3	Regional
Snails & Mussels	25	5	Regional
Total	**449**	**110**	

CHAPTER 6.0

OVERVIEW OF NATURAL RESOURCES RELATED REGULATORY REQUIREMENTS

6.1 INTRODUCTION

This chapter provides an overview of regulations and guidance related to management of natural resources by the U.S. Army at the 417th BSB Würzburg. Environmental compliance requirements for DoD components in Germany are set forth in applicable U.S. laws, Executive Orders, DoD Directives, and component regulations that have overseas application. The Environmental Final Governing Standards - Germany (FGS) provide the single definitive source of environmental compliance criteria applicable to DoD installations and U.S. Forces' activities in Germany (DoD, March 1996). The FGS were developed via a comparative analysis of criteria contained in DoD's Overseas Environmental Baseline Guidance Document and the substantive environmental protection standards and practices of the federal and state governments in Germany. In addition to the FGS, U.S. Army, Europe (USAREUR) regulations impose additional policy requirements. In general, the FGS define specific criteria or standards for compliance but do not provide guidance or procedures for achieving compliance. Commanders are given the widest possible latitude to develop appropriate compliance projects and programs. Applicable DoD Directives, Instructions, Manuals, Army Regulations, Army guidance documents, as well as applicable German Regulations and procedures, are used to develop natural resources compliance programs at the 417th BSB Würzburg. The following sections provide a brief overview of applicable, regulations, laws, and guidance for natural resources management at the 417th BSB Würzburg. Resource-specific regulatory requirements and compliance program guidance are discussed for each management program in Volumes II and III.

6.2 DEPARTMENT OF DEFENSE AND U.S. ARMY REGULATIONS AND GUIDANCE

6.2.1 Department of Defense Regulations and Guidance

- **Environmental Final Governing Standards Germany (FGS).** DoD. (March 1996). The FGS provides specific standards for environmental protection for DoD activities and installations in Germany. It implements DoD Directive 6050.16 (20 September 1991). Chapter 13 - Natural Resources and Endangered Species contains specific requirements for this INRMP. Additional FGS chapters that are most relevant to this INRMP include: Chapter 3 - Drinking Water and Chapter 4 - Wastewater, Chapter 11 – Pesticides.

- **Executive Order 12114.** *Environmental Effects Abroad of Major Federal Actions.* (4 January 1979). While based on independent authority, this Order furthers the purpose of the National Environmental Policy Act consistent with the foreign policy and national security policy of the United States and represents the United States government's exclusive and complete determination of the procedural and other actions to be taken by Federal agencies to further the purpose of the National Environmental Policy Act, with respect to the environment outside the United States, its territories and possessions.

- **DoD Instruction 1015.10** *Programs for Military Morale, Welfare, and Recreation* (3 November 1995). Implements policy, assigns responsibilities, and prescribes procedures for operating and managing programs for military MWR. It establishes the requirement for installation MWR Programs to maintain mission readiness and productivity through physical fitness, camaraderie/unit cohesion, individual growth/development, and support family well-being and quality of life.

- **DoD Instruction 4150.7** *DoD Pest Management Program.* (22 April 1996). This Instruction implements policy, assigns responsibility, and prescribes procedures for the Department of Defense Pest Management Program. It also authorized the publication DoD 4150.7-M, DoD Pest Management Training and Certification, and DoD 4150.7-P, DoD Plan for the Certification of Pesticide Applicators. It also designates the Secretary of the Army as the DoD Executive Agent for the Armed Forces Pest Management Board (AFPMB).

- **DoD Instruction 4715.1** *Environmental Security*. (22 April 1996) This instruction implements, in accordance with Section 342(b) of Public Law 101-510, National Defense Authorization Act Fiscal Year 1991 (4 November 1990), Executive Order 12344, and the Naval Nuclear Propulsion Program (1 February 1982), policy, assigns responsibilities, and prescribes procedures under Section 342(b) above, establishing environmental compliance standards for protection of human health and the environment at DoD installations in foreign countries.

- **DoD Instruction 4715.5** *Management of Environmental Compliance at Overseas Installations.* (22 April 1996). This instruction implements policy, assigns responsibilities, and prescribes procedures, under DoD Directive 4715.1 - Environmental Security, February 24, 1996, establishing environmental compliance standards for protection of human health and the environment at DoD installations in foreign countries. It replaces DoD Directive 6050.16 - DoD Policy for Establishing and Implementing Environmental Standards at Overseas Installations, 20 September 1991.

- **DoD Instruction 4715.3** *Environmental Conservation Program* (3 May 1996). This instruction prescribes procedures for the integrated management of natural and cultural resources on property under DoD control. The instruction states, in part, that *"environmentally and economically beneficial landscape practices shall be used on all DoD lands.[and], each installation shall, to the extent practicable, use regionally native plants for landscaping and other beneficial techniques"*. Beneficial Techniques are defined as an array of landscaping techniques that help retain the natural landscape features and native vegetation of undeveloped land (including wetlands, woodlands, and natural drainage features), reduce the need for pesticides and fertilizers, reduce the heating and cooling needs of buildings (shading, windbreaks), and reduce the need for internal combustion engines to drive landscape maintenance equipment. The term also refers to sites designed to incorporate natural drainage approaches, such as swales and vegetated "filter strips," in contrast to storm sewers and artificial drainage channels.

- **DoD Manual 4160.21-M.** *Defense Reutilization and Marketing Manual.* (23 March 1990). The contents of this manual are applicable to all elements of the DoD, their subordinate commands, installations and activities, worldwide, except as otherwise indicated. It applies to the disposition of excess, surplus and foreign excess personal property, and other property. Provisions of this manual affecting Defense Reutilization and Marketing Service (DRMS) operations are also applicable to Federal civil agency excess and surplus property turned-in to a Defense Reutilization

and Marketing Office (DRMO), for disposition under applicable Interagency - Agreements.

- **TIM 14.** *Protective Equipment for Pest Control Personnel.* (March 1992).
- **TIM 15.** *Pesticide Spill Prevention and Management.* (June 1992).
- **TIM 16.** *Pesticide Fire Prevention, Control, and Cleanup.* (June 1981).
- **TIM 17.** *Pest Control Facilities.* (no date).
- **TIM 18.** *Installation Pest Management On-site Reviews.* (no date).
- **TIM 21.** *Pesticide Disposal Guide for Pest Control Workshops.* (October 1986).
- **TIM 29**. *Integrated Pest Management in and around Buildings.* (1994).
- **Under Secretary of Defense (Environmental Security) Memorandum** *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds.* (23 September 1994). This memorandum, in response to the White House Memorandum below, suggests that environmentally and economically beneficial landscaping practices be incorporated as standard policy in installation Integrated Natural Resources Management Plans.
- **White House Memorandum.** *Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds.* (26 April 1994). This memorandum directs Federal agencies, where cost-effective and practicable, to 1) use regionally native plants for landscaping; 2) promote construction practices that minimize adverse effects on the natural habitat; and 3) prevent pollution by reducing fertilizer and pesticide use and minimizing runoff. Landscaping practices that reduce the use of toxic chemicals provide an effective approach for reaching reduction goals established in Executive Order 12856, Federal Compliance with Right-to-know Laws and Pollution Prevention Requirements, 3 August 1993.

6.2.2 U.S. Army Regulations and Guidance

- **Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys and Integrated Natural Resources Management Plans.** Department of the Army, Installation Management. (21 March 1997). Specifies Army goals and implementing guidance for AR 200-3.

- **AR 40-5** *Preventive Medicine.* (15 October 1990). This regulation provides a solid foundation of environmental issues from a health and safety perspective. Of particular interest are:

  Chapter 10 - Pest and Disease Vector Control. This chapter covers pest control equipment and devices, aerial dispersion of pesticides, training and certification, etc.

  Chapter 11 - Environmental Quality. This chapter covers wastewater, air quality, hazardous wastes, solid waste, noise, spill control, pesticide monitoring, etc.

  Chapter 12 - Sanitation. This chapter covers drinking water standards including flourination and chlorination and field water supply systems. It also includes guidance on providing an adequate potable water supply, waste disposal, drainage, prevention of soil erosion, and protection of watersheds for recreational areas.

- **AR 200-1** *Environmental Protection and Enhancement.* (23 April 1990). This regulation provides a brief overview of environmental programs and requirements. It does not provide a complete listing of requirements or detailed guidance on complying with environmental laws and regulations. In addressing environmental issues, readers must consult the applicable laws, regulations, and guidance documents referenced in this regulation. This regulation supplements Federal, state, and local environmental laws for preserving, protecting, and restoring the quality of the environment. It also integrates pollution prevention, natural and cultural resources, and the National Environmental Policy Act (NEPA) into the Army Environmental Program.

- **AR 200-2** *Environmental Effects of Army Actions.* (23 December 1988). This regulation sets forth policy, responsibilities, and procedures for integrating environmental considerations into Army planning and decision-making. It establishes criteria for determining what Army actions are categorically excluded from requirements to prepare an Environmental Impact Statement (EIS) and lists applicable categorical exclusions (CX) in appendix A

- **AR 200-3** *Natural Resources - Land, Forest, and Wildlife Management.* (25 February 1995). Sets forth responsibilities, policies, and procedures to wisely use, scientifically manage and systematically restore renewable natural resources existing on Army lands consistent with the local military mission, national security, and current Federal laws pertaining to renewable natural resources and the quality of the environment.

- **AR 200-5** *Pest Management.* (3 June 1986). This regulation provides policies, standards, and procedures for pest control activities at U.S. Army installations. It sets minimum levels of pest management operations in real property maintenance activities (RPMA). These operations are compatible with national mandates and for protecting the environment.
- **AR 210-21** *Army Ranges and Training Land Program.* (1 May 1997). Although this regulation is primarily related to range and training operations, it does contain several relevant guidelines such as Section 3.5 - Integrated Training Area Management, Section 5-11 - Hunting, Fishing, and Other Recreational Activities, and Section 5-15 - Installation Compatible Use Zones.
- **AR 350-4** *Integrated Training Area Management.* (8 May 1998). This regulation sets forth the objectives, responsibilities, and policies for the ITAM Program. ITAM establishes procedures to achieve optimum, sustainable use of training lands by implementing a uniform land management program that includes inventorying and monitoring land conditions, integrating training requirements with training land carrying capacity, educating land users to minimize adverse impacts, and providing for training land rehabilitation and maintenance.
- **AR 405-80** *Management of Title and Granting Use of Real Property.* (11 November 1997). This regulation states the policy on management of title, unauthorized use, and granting use of Army controlled real property. It consolidates and delegates authority to issue, execute, manage, renew, supplement or revoke outgrants authorizing the use of Army real property and to perform certain management activities.
- **AR 420-46** *Water Supply and Wastewater.* (1 May 1992). This regulation establishes policies, criteria, responsibilities, and procedures for operation, maintenance, repair, and construction of distribution, collection, treatment, and disposal facilities for water supply, wastewater, storm water, and industrial waste.
- **Army Technical Manual 5-629** *Weed Control and Plant Growth Regulation.* (24 May 1989). Gives guidance related to weed control with and without using herbicides. Specific guidance is given to the technical needs of land managers and grounds maintenance personnel.
- **Army Technical Manual 5-630** *Natural Resources Land Management.* (July 1982). Gives guidance pertinent to natural resources management and integration of land management for installation activities with natural resource management.

- **Army Technical Manual 5-631** *Natural Resources Forest Management.* (December 1981). Identifies management components and personnel needs for managing forest resources. Specific guidance is given to the technical needs of land managers and foresters.

- **Army Technical Manual 5-634** *Solid Waste Management.* (May 1990). This manual discusses managerial, engineering, and operational issues associated with: handling and storage of waste; refuse collection; transfer stations sanitary landfills; volume reduction techniques; resource recovery (material and/or energy); recycling centers at military bases. The Military Construction Codification Act (PL 97-214) of 1982 is also discussed as it applies to recycling programs in the military.

- **Army Technical Manual 5-635** *Natural Resources: Outdoor Recreation and Cultural Values.* (February 1982). Defines resources with recreational value and provides guidance for identifying, classifying, developing, and protecting archeological, historical, geological, botanical, and scenic resources.

- **Army Technical Manual 5-813-3** *Water Supply, Water Treatment.* (16 September 1985). This manual, intended for planners and design engineers, presents information on water quality standards and design criteria for water treatment processes. This manual also establishes criteria to be followed in determining the necessity for and the extent of treatment, and on procedures applicable to the planning of water treatment projects. This manual is applicable to all elements of the Army and Air Force responsible for the planning and design of military construction.

- **DA Pam 350-4** *Integrated Training Area Management (ITAM), Coordinating Draft* (24 August 1998). This Pamphlet provides detailed information and comprehensive references on the Army' s ITAM Program. It provides descriptions of policies and standard operating procedures for the ITAM Program, which is under proponency responsibility of the Headquarters Department of the Army Office of the Deputy Chief of Staff for Operations and Plans. It follows the policy set forth by AR 350-4, which includes objectives, responsibilities, and policies for the ITAM Program. It describes how each of the ITAM components contributes to the overall objectives of sustaining a well-trained and equipped combat force through sound environmental stewardship of natural and cultural resources on lands under the control of the Army.

- **Guidelines to Prepare Integrated Natural Resources Management Plans for Army Installations and Activities.** U.S. Army Environmental Center. (April 1997). These guidelines are intended to support the Army policy of preparing and implementing INRMPs as directed by Army Memorandum (21 March 1997), *Army*

Goals and Implementing Guidance for Natural Resources Planning Level Surveys (PLS) and Integrated Natural Resources Management Plan (INRMP), and to assure that Army stewardship requirements are being addressed and executed on Army installations. These guidelines consist of four parts. Part I includes a discussion of the compliance requirements, goals, stewardship, National Environmental Policy Act (NEPA) requirements, INRMP preparation process, INRMP preparation principles, and INRMP standardization. Part II contains an annotated outline for each of the major chapters of the INRMP. Part III is a checklist of possible elements that could be included in the INRMP or documents that could be consulted or referenced. Part IV is a list of laws that evoke certain conservation actions.

- **Integrated Training Area Management (ITAM) Geographic Information System (GIS) Regional Support Center (RSC) Support Services Pamphlet**. U.S. Army Environmental Center. (no date). This pamphlet outlines procedures and support services available from the Integrated Training Area Management (ITAM) Geographic Information System (GIS) Regional Support Centers (RSC's). This pamphlet does not outline the level of GIS support each installation receives; rather it describes the kinds of support provided and the general operation of RSC's. Installation-specific support tasks will be updated at least annually in coordination with Major Army Commands (MACOMs).

- **Integrated Training Area Management (ITAM) Strategy.** U.S. Army Environmental Center. (August 1995). The ITAM Program is a management and decision-making process to integrate Army training and other mission requirements for land use, with sound natural resource management of land. The purpose of the ITAM Strategy is to provide a standardized description, policies and procedures for the program, and establish a plan for its Army-wide implementation. This document will be superceded by DA PAM 350-4, when it is finalized.

- **ITAM Technology Configuration Management Process Standard Operating Procedure (SOP).** U.S. Army Environmental Center. (6 February 1998). This SOP establishes a technology configuration management process to ensure that technological capabilities are developed and used effectively and efficiently in the ITAM program. The objective is to provide technology to the field in support of user requirements for more efficient management of Army training land.

- **USAREUR Regulation 200-1** *USAREUR Environmental Quality Program.* (9 December 1993). Prescribes USAREUR policy, responsibilities, and procedures to preserve, protect, enhance, and restore the quality of the environment.

- **USAREUR Regulation 690-80** *Employment of Local National Pest Control Personnel*. (29 December 1988).
- **USAREUR Supplement 1 to AR 420-46** *Water and Sewage.* (19 January 1984).
- **USAREUR Supplement 1 to AR 200-5** *Pest Management Program.* (22 April 1982).

For additional information including the compliance responsibilities of the above mentioned regulations see *The Environmental Compliance Assessment System (ECAS), US Army Europe, Volume One USAREUR Protocols.* (USAREUR, 3 April 1995a).

6.3 EUROPEAN COMMUNITY, GERMAN FEDERAL AND STATE LAWS, AND GUIDANCE

6.3.1 European Community Laws and Guidance

- **COUNCIL DIRECTIVE 79/409/EEC.** (1979) Known as the Wild Birds Directive this directive is one of the main directives introduced by the EU on nature conservation. It establishes a complex scheme for the protection of wild birds and their habitats which requires the Member States to designate habitats, called Special Protection Areas (SPAs) for particularly vulnerable species (listed in Annex I) and to ensure the implementation of special habitat conservation measures. So far, 106 areas covering 205,300 hectares have been designated in Ireland, most of which are already in Nature Reserves. The original list of 74 species in Annex I was increased to 114 species by DIRECTIVE 85/411/EEC. Annex II lists those species which may be hunted but in such a manner so as not to endanger their conservation. Certain other restrictions were placed on hunting - again these are listed in the Annexes. The sale of wild birds is also prohibited under the Directive. A further amendment in 1991 (Commission Directive 91/244/EEC) prohibited the marketing of the white-fronted goose (Greenland) and black grouse (continental). Recently, yet another amendment to the Directive secured a qualified majority in the Council of Ministers. The amendment is intended to ensure that Annex II of the Directive includes certain species for which Member States are entitled to authorize hunting.

- **COUNCIL DIRECTIVE 92/43/EEC.** (21 May 1992). This council directive on the conservation of natural habitats and of wild fauna and flora is an important Directive, elaborating on the Berne Convention which came into effect in September 1992. Commonly known as the Habitats Directive, its purpose is to promote and ensure biodiversity through the conservation of habitats and of wild fauna and flora in the European Territory. The Directive is made up of two major sections, the first dealing with habitat conservation, the second with species protection. With regard to the first, the Directive requires all Member States to contribute to the establishment of a European network (Natura 2000) of Special Areas of Conservation (SACs) which will enable the natural habitat and species habitats (listed in the Annex I and II) to be maintained, if appropriate, restored to a favorable conservation status. Annex I lists natural habitat types of Community interest (200 in all including 45 coastal habitats) while Annex II lists animals and plant species whose conservation would require the designation of SACs. Also contained in the annexes are the criteria for selection of SACs (Annex III). The Natura 2000 network will include all Special Protection Areas designated under Council Directive 79/409/EEC (Birds Directive). Member States are required to have submitted a list of sites to the European Commission by May 1995 indicating which natural habitat types and species native to its territory are hosted by the sites. From these, the Commission will establish a draft list of Sites of Community Importance (SCIs). Member States must take the necessary measures to ensure conservation of their SACs and the Natura 2000 network will be periodically reviewed. The second major section of the Directive deals with the protection of species. Annex IV lists animal and plant species of Community interest in need of strict protection. The species listed and their eggs must be protected from deliberate killing or disturbance, and destruction or deterioration of their breeding or resting sites is prohibited. Annex IV also lists plants which require strict protection and whose picking, collecting, uprooting or destruction is prohibited. Annex V lists animal and plant species of Community interest whose exploitation may be subject to management measures and, finally, Annex VI lists methods of capture and killing and modes of transport which are prohibited.

Currently, no European Community regulations are incorporated into DoD, U.S. Army, or USAREUR regulations. This process is ongoing and revised regulations and protocols should be available soon.

6.3.2 German Federal and State Laws and Guidance

- **22. Allgemeine Verwaltungsvorschrift über Mindestanforderungen an das Einleiten von Abwasser in Gewässer-Mischabwasser (22. AbwasserVwV)**. *22nd General Administrative Regulation Concerning Minimum Requirements for the Discharge of Wastewater in Water Bodies-Mixed Wastewater.* (1996).
- **ABSP Arten- und Biotopschutz**. *Species and Biotope Protection Program.* Staatsministerium für Landwirtschaft und Umwelt (1988-1994). Specific to the county of Neumarkt Oberpfalz. A separate program is available for each Bavarian County. The program provides advice regarding the occurrence of important species and habitats, and makes recommendations for their conservation.
- **Bayerisches Waldgesetz (BayWaldG)**. *Forest Law of Bavaria.* (25 August 1985). The goal of this law is to conserve forests and their status; to produce timber and other natural products; and to preserve forests as a recreation facility for the public.
- **Bayerisches Wassergesetz (BayWG)**. *Bavarian Water Act.* (19 July 1994). Gives guidance regarding the rights and responsibilities for water use.
- **Bundesartenschutzverordnung (BArtSchG)**. *Federal Species Protection Ordinance*. (18 September 1989). This law contains lists of flora and fauna that receive federal protection regarding import and export of certain species.
- **Bundesnaturschutzgesetz (BNatSchG)**. *Federal Nature Protection Act*, in particular § 20c. This paragraph gives a list of all biotope types that must not be destroyed or changed without official allowance.
- **Bundeswaldgesetz (BWaldG)**. *Federal Forest Act*, in particular § 45 BWaldG. This paragraph states that nature preservation activities must not interfere with military use.
- **Erlaß des Bundesfinanzministers**. *Decree of the Secretary of the Treasury*. (28 August 1995). VI A 5-VVG 3300 - 14/95-. This "Forest Management Decree", regulates the principles of forest management and its goals in all federal forests.
- **Gesetz über den Schutz der Natur, die Pflege der Landschaft und die Erholung in der freien Natur Bayerisches Naturschutzgesetz (BayNatSchG)**. *Bavarian Nature Protection Law.* (10 October 1982). In particular Article 6 d1 BayNatSchG. This paragraph gives a list of all biotope types that must not be destroyed or changed without official authorization. Goals of this law are described under BNatSchG.

- **Gesetz über Naturschutz und Landschaftspflegerecht, Bundesnaturschutzgesetz (BNatSchG)**. *Federal Nature Protection and Land Management Law.* (BGB1. I 1997 S.889...BGB1. I 1997 S.2081). The goal of this law is to protect the flora and fauna in their natural habitats with an emphasis on diversity.
- **Gesetz zum Schutz der Boden, Bundesbodenschutzgesetz, (BBodSchG).** *Federal Soil Protection Law* (17 March 1998).
- **Gesetz zum Schutz der Kulturpflanzen, Pflanzenschutzgesetz (PflSchG)**. *Plant Protection Law.* (14 May 1998).
- **Gesetz zur Ordnung des Wasserhaushalts, Wasserhaushaltsgesetz (WHG)**. *Water Resources Act.* (12 November 1996). Gives guidance regarding the property rights of water use. Included are injunctions for water supply, wastewater, etc.
- **Landesgesetz über Naturschutz und Landschaftspflege, Landespflegegesetz (LPflG)**. *State Laws of Nature Protection and Care of the Landscape.* (5 February 1979). Same as BayNatSchG.
- **Liste der vom Bundesgesundheitsamt geprüften und anerkannten Desinfektionsmittel und Verfahren.** *Federal Public Health Department List of Tested And Accepted Substances and Methods for Disinfection.* (March 1984).
- **Liste der vom Bundesgesundheitsamt geprüften und anerkannten Entwesungsmittel und Verfahren zur Bekämpfung tierischer Schädlinge**. *List published by the Federal Public Health Department of tested and recognized/accepted substances and methods for the killing of vermin, parasites and pests (anthropods).* (July 1986).
- **Protocol of Meeting Concerning Cooperation Between U.S. Major Training Area Commanders and the Chiefs of the Federal Forestry Service.** (15 December 1983).
- **Rote Liste Bayern**. *Red List Bavaria.* (1990-1992). Contains lists of species which are endangered and/or threatened in Bavaria.
- **Rote Liste Deutschland**. *Red List Germany.* (1994). Contains lists of species which are endangered and/or threatened in Germany.
- **Verordnung über Anlagen zum Lagern, Abfüllen und Umschlagen wassergefährdender Stoffe und die Zulassung von Fachbetrieben, Anlagen- und Fachbetriebsverordung (VAwSF)**. *Bavarian Ordinance Dealing with Facilities for*

the Storage, Filling, and Transportation of Water Hazardous Substances and the Permission of Special Operations. Comprises a portion of the Bavarian Water Act.

- **Verordnung über die Erfassung von Wasserentnahmen**. *Regulation on the Registration of Water Uses.* (13 March 1990). Comprises a portion of the Bavarian Water Act.
- **Verordnung über Trinkwasser und über Wasser für Lebensmittelbetriebe, Trinkwasserverordnung (TrinkwV)**. *Water Quality Standards for Drinking Water and Water Used for Food Preparation.* (12 December 1990).
- **Verordnung zur Bereinigung pflanzenschutzrechtlicher Vorschriften**. *Ordinance for the Adjustment of Plant Protection/Agricultural Control Regulations.* (10 November 1992).

For additional information including the compliance responsibilities of the above mentioned laws and regulations see *The Environmental Compliance Assessment System (ECAS), U.S. Army Europe, Volume Two German Protocols* (USAREUR, 3 April 1995b).

6.4 NORTH ATLANTIC TREATY ORGANIZATION STATUS OF FORCES AGREEMENT

The Status of Forces Agreement is the legal agreement between the parties of the North Atlantic Treaty Organization (NATO), established on 4th April 1949, by which the Forces of one party may be sent, by agreement, to serve in the territory of another party. Supplemental Agreements have then been made between the relevant host state and sending states regarding the conditions under which the Forces will be sent. Recent amendments to the Supplemental Agreement for NATO Forces stationed in the Federal Republic of Germany were made on 18 March 1993 and approved on 28 September 1994. A revised NATO SOFA Supplementary Agreement (SA) became effective on 29 March 1998. Under the original NATO SOFA, sending states are obligated to 'respect' host nation law. The previous SA's were silent with respect to German law and sending states have generally interpreted 'respect' as being less than 'obey'. Therefore, the U.S. Army has not been required to comply with the procedural requirements of German Law (particularly in the case of obtaining certain permits or the environmental impact assessment process). The new articles

to the SA now imply that the sending states must 'obey' German Law. There are several articles that impact the way natural resources are managed. Summaries of the most significant Articles with respect to the INRMP are provided below only as general guidance and are not intended to be inclusive.

Article 45 - Maneuvers and Other Training Exercises: The conduct or participation in maneuvers and other training exercises in accordance with this Article by elements of a force which come to the Federal Republic for this purpose shall require the approval of the relevant German authorities. The conduct of maneuvers and other training exercises, in accordance with this Article, shall be governed by the relevant provisions of German law, in particular the Federal Requisitioning Law of September 27, 1961, as amended.

Article 49 – Construction: Construction works shall be carried out by the German authorities responsible for Federal building in accordance with German legal provisions and administrative regulations in force, and in accordance with special administrative agreements. Notwithstanding the last sentence, the authorities of a force and of a civilian component may carry out, in consultation with the German authorities, repairs and maintenance work, construction which require special security measures, very minor construction works (and in agreement of German authorities), minor construction works, exceptional construction works in other cases with their own personnel or by placing contracts direct with contractors. In carrying out such works, the authorities of a force or civilian component shall respect German building and environmental regulations and shall ensure, in cooperation with German authorities, that the necessary permissions are obtained.

Article 53 - Rights Respecting Installations: German law shall apply to the use of installations except as provided in the present agreement and other international agreements. Cooperation between the force and the German authorities in accordance with this Article shall extend in particular to environmental protection (including sites rendered hazardous by soil contamination), basic preservation of land and buildings, forestry operation, hunting, shooting, and fishing.

Article 53A - Special Permits and Licenses in Connection with Use of Installations: This

Article requires sending states to obtain permits, licenses or other forms of official approval for activities within an accommodation if required by law. Facilities and activities which were in existence on 29 March 1998 and which normally would require a permit may continue to operate without a permit. However, those activities must be reported through the Federal authorities to the authorities responsible for enforcement of the respective law no later than 29 March 1999.

Article 54 - Health and Sanitation: This Article requires sending states to comply with German regulations and procedures for the prevention and control of infectious diseases of humans, animals, and plants as well as for the prevention and control of plant pests. A force and civilian component may apply its own regulations and procedures in the areas referred to in the preceding sentence provided that neither public health (öffentliche Gesundheit) nor the cultivation of plants is endangered.

Article 54A - Environmental Protection: The authorities of a force and of a civilian component shall examine as early as possible the environmental effects of environmentally significant projects on persons, animals, plants, soil, water, air, climate and landscape including interactions among them, as well as cultural and other property. The objective of the examination shall be to avoid environmental impacts and, where detrimental effects are unavoidable, to offset them by taking appropriate restorative or mitigating measures. The authorities of a force and of a civilian component may call upon the assistance of German civil and military authorities.

Article 54B - Fuels, Lubricants, and Additives: The authorities of a force and of a civilian component shall ensure that only fuels, lubricants, and additives that are low-pollutant in accordance with German environmental regulations are used in operation of aircraft, vessels, and motor vehicles, insofar as such use is compatible with the technical requirements of such aircraft, vessels, and motor vehicles.

CHAPTER 7.0

NATURAL RESOURCES PROGRAM

STRUCTURE AND RESPONSIBLE PARTIES

7.1 INSTALLATION ORGANIZATIONS

The Environment Management Office (EMO) has primary responsibility for implementation of the INRMP at the 417th BSB Würzburg. EMO is a branch within the Directorate of Public Works, one of the main staff elements of the 417th BSB Würzburg. As shown in Figure 7.1.1, other branches of Directorate of Public Works and the Directorate of Community Activities (DCA) share responsibility for the implementation of various activities addressed by the INRMP.

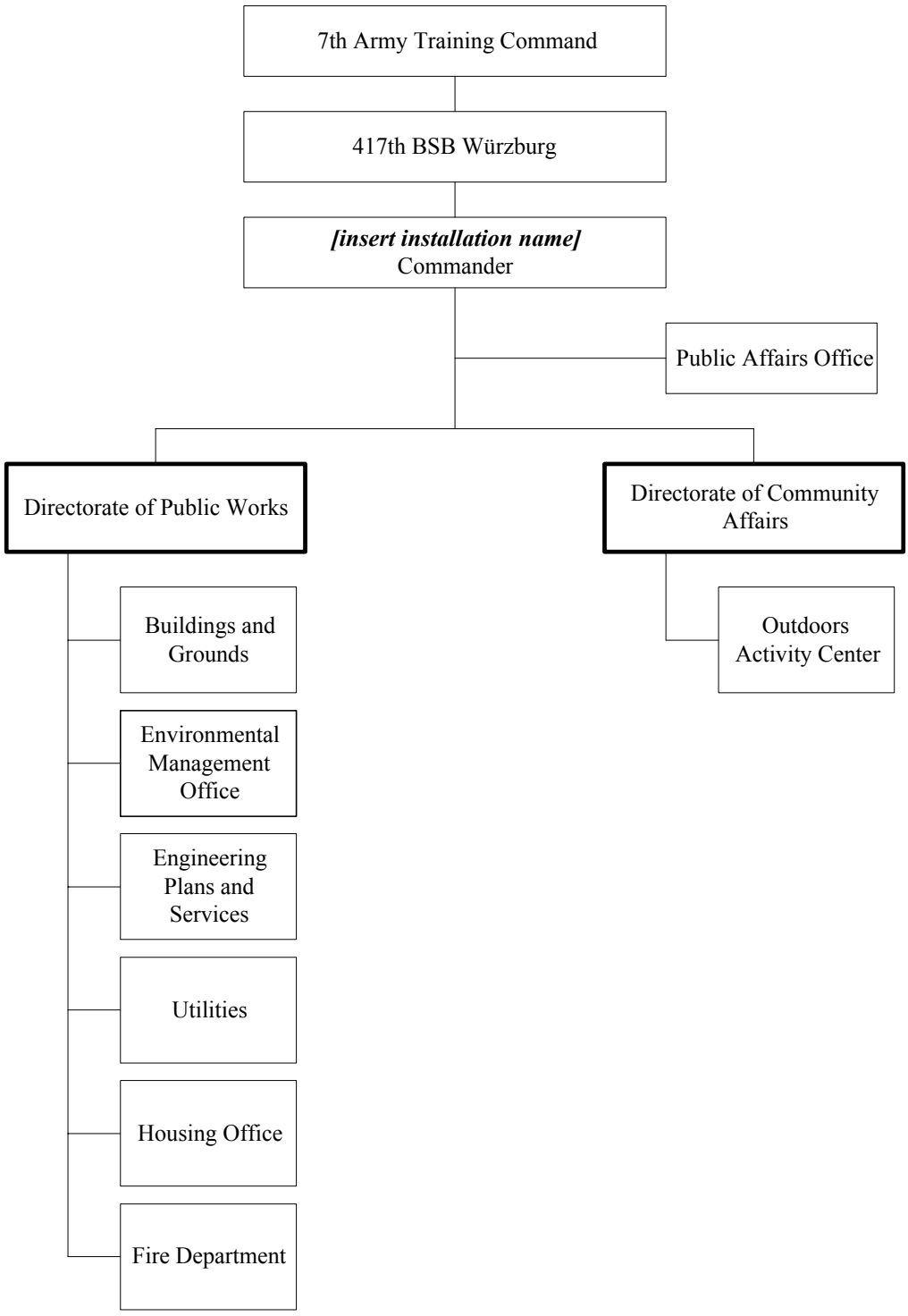
Within the EMO, natural resources management programs are divided into two major categories: Environmental Resources Management and Integrated Training Area Management (ITAM). The Environmental Management Program is implemented by staff in the EMO office and the ITAM program is implemented by Range Control.

7.2 OTHER DEFENSE ORGANIZATIONS

The Army Corps of Engineers, Europe District provides technical, project management, and contracting support to the 417th BSB Würzburg EMO. In addition, technical support is provided by HQ USAREUR. At the present time no other defense organizations are directly involved with the implementation of the INRMP.

FIGURE 7.1.1

ORGANIZATION CHART FOR NATURAL RESOURCE MANAGEMENT PROGRAMS



7.3 GERMAN AGENCIES

Various German federal and state agencies are responsible for management of certain resources that are addressed in the INRMP. Responsibility for forest management activities at the 417th BSB Würzburg is split between the Bundesforstamt, Staatsforstamt, Public Owners and Private Owners. The Bundesforstamt is responsible for forest management on all land owned by the Federal Republic of Germany, and the State Forest Service of Bavaria (Staatsforstamt) manages all forests on land owned by the state. Public and private owners are responsible for managing the forested areas they own. For a more detailed explanation of their role refer to Volume III, Section 14.3, page ***[insert page number]***.

The German Federal Assets Office (FAO) (Bundesvermögensamt) serves as the representing agency for the land owner within the boundaries of the 417th BSB Würzburg, and therefore the main partner for US Personnel in dealing with other State, County and City authorities and with private persons. Contracts for agricultural and grazing leases are established between the FAO and the interested third party directly. The US forces can initiate subject contracts and must review them to avoid interference with the mission. The Agricultural and Grazing Lease Program for lands within the boundary of 417th BSB Würzburg is described in more detail in Volume III, Section 14.8, page ***[insert page number]***.

7.4 UNIVERSITIES

In the past, various universities from the U.S. and Germany have provided natural resources technical support to many USAREUR installations. However, it is understood that universities are not directly involved with the implementation of the INRMP at the present time. Universities could possibly be used as contractors or subcontractors in the future.

7.5 CONTRACTORS

Contractors are used by the 417th BSB Würzburg to provide assistance with a variety of natural resources projects. For example, contractors currently provide the following support:

- Threatened and endangered species surveys as part of the Rare, Threatened and Endangered Species Management Program;
- Landscaping and renovation as part of the Buildings and Grounds Maintenance Program; and
- Erosion control work.
- Tree surveys/inventories

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CHAPTER 8.0

LAND USE AND MANAGEMENT UNITS

8.1 INTRODUCTION

This section describes lands uses and land management units at the 417th BSB Würzburg. This installation has 14 sites, which support multiple uses and a variety of users. Both the U.S. Army and the host nation are responsible for land use management, and land uses overlap one another in many instances. Consequently, several types of land management units have been used to classify the installation.

8.2 LAND USES

The installation is divided into two broad areas of land use: (1) training area and (2) cantonment area. There are 9 cantonment areas totaling 2,321.36 acres (939.44 hectares) and 5 training areas 2,816.07 acres (1,139.65 hectares) and these are listed in more detail in Tables 8.3.1 and 8.3.2.

8.2.1 Land Uses in Cantonment Area

The cantonment areas consists of approximately 2,321.36 acres (939.44 hectares). Land uses in the cantonment areas include administration, housing, community facilities, outdoor recreation, industrial, medical facilities, military training (e.g., small arms ranges), equipment maintenance, and airfields.

8.2.2 Land Uses in Training Area

The training areas at the 417th BSB Würzburg supports multiple land uses and encompasses 2,816.07 acres (1,139.65 hectares). . The training areas are primarily used for common soldier task testing (i.e. Roman Hill, Larson L1-L3, Harvey Barracks, Klosterforst), operations in support of the Bosnia mission (i.e MOUT area and NATO Refueling Area at Klosterforst) and facilities for engineers (Klosterforst, Fahr). Additional land uses include commercial forestry, sheep grazing, arable agriculture, hunting, and fishing.

8.3 LAND MANAGEMENT UNITS

Several types of land management units exist at the at the 417th BSB Würzburg due to the variety of land uses and the fact that the U.S. Army and the host nation share management responsibility. The 417th BSB Würzburg can be divided into three principle land management units, improved grounds, semi-improved grounds and unimproved grounds and these are listed in Tables.8.3.1 and 8.3.2 for all of the associated parcels of land. It should be noted that within this report the values detailed for Larson Barracks, include the adjacent training area, as there is insufficient clarity on where the cantonment area ends and the training area begins.

Improved grounds are defined as those lands on which intensive maintenance activities must be planned and performed annually as fixed requirements. All of the improved grounds at the 417th BSB Würzburg are located in the cantonment areas and make up approximately ***[insert percentage]*** of the installation. Semi-improved grounds are those areas where periodic, recurring maintenance is performed but to a lesser degree than on improved grounds. Approximately ***[insert percentage]*** of the installation consists of semi-improved grounds. Unimproved grounds include areas requiring limited or no maintenance. The majority of the installation consists of unimproved grounds ***[insert percentage]***. Details on grounds maintenance activities associated with each category are provided in Volume II, Chapter 11.12, page ***[insert page number]***.

TABLE 8.3.1

GROUND CLASSIFICATIONS AT THE 417th BSB WÜRZBURG FOR THE CANTONMENT AREAS

(For clarity values have only been given in hectares)

Location	Grounds Classification (Hectares)			Total
	Improved	Semi-improved	Unimproved	
AST Wurzburg				
Breitshol Radio Site	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	0.98
Faulenberg Kaserne	0.70	0.57	11.45	12.72
U.S. Hospital	1.15	0.96	3.51	5.62
Leighton Barracks	42.80	17.50	75.55	135.85
AST Kitzingen				
Harvey Barracks	12.98	43.93	191.38	248.29
Larson Barracks *	39.24	41.76	172.92	253.92
Marshall Heights	18.05	0.16	14.00	32.21
Schwanberg Radio Site	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	1.16
AST Giebelstadt				
Giebelstadt Area	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	248.69
Totals	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	**939.44**

** See Section *8.3 on adjacent land use.*

TABLE 8.3.2

GROUND CLASSIFICATIONS AT THE 417th BSB WÜRZBURG BASED FOR THE TRAINING AREAS

(For clarity values have only been given in hectares)

Location	Grounds Classification (Hectares)			Total
	Improved	Semi-improved	Unimproved	
AST Wurzburg				
Roman Hill Range	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	8.21
AST Kitzingen				
Fahr	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	2.39
Gerlachshausen	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	5.36
Klosterforst	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	1,088.26
Michelfeld	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	35.43
Totals	***[insert hectares]***	***[insert hectares]***	***[insert hectares]***	**1,139.65**

8.3.1 Land Management Units in Cantonment Area

The cantonment areas consist of the following principle land management units:

- Improved grounds - ***[insert size in acres (insert size in hectares)] [insert percentage]***;
- Semi-improved grounds - ***[insert size in acres (insert size in hectares) [insert percentage]]***; and
- Unimproved grounds - ***[insert size in acres (insert size in hectares) [insert percentage]]***.

Secondary land management units within the cantonment can be identified for grounds maintenance purposes. These units include: developed areas (for example, buildings, roads, other paved areas, etc.), landscaped areas, and mowed areas (based on frequency of required

mowing). Landscaped areas and mowed areas are discussed in more detail in Volume II, Section 11.12, page ***[insert page number].***

Three outleases for sheep grazing at the 417th BSB Würzburg were in place during 1998. Each of the 3 shepherds has been assigned a grazing area by the Federal Assets Office, one of them at Larson Barracks, two at Harvey Barracks. The total area covered by the leases is approximately 247.1 acres (100 hectares). The grazing area at Larson Barracks consists of approximately 111.2 acres (45 hectares), the two grazing areas at Harvey Barracks together consist of approximately 111.2 acres (45 hectares).

8.3.2 Land Management Units in Training Area

The training area consists of the following principle land management units:

- Semi-improved grounds - ***[insert size in acres (insert size in hectares)] [insert percentage]***;and
- Unimproved grounds - ***[insert size in acres (insert size in hectares)] [insert percentage]***.

Semi-improved grounds in the training areas include the MOUT site, NATO Refueling Area, the Grenade Practice Course, the M203 Range, and the Bradley Crew Proficiency Course, and the Confidence Course. The majority of the training areas can be classified as unimproved grounds. Maintenance activities are performed as needed on unimproved grounds within the training areas to protect the environment and sustain realistic and safe training conditions. Additional land management units have been established within the training areas based on land uses and environmental conditions. These management units include 'environmentally sensitive areas', and grazing areas. Environmentally sensitive areas have been designated throughout the training area for various purposes and are off-limits to most training activities. Boundaries will be delineated with Seibert Stakes. Environmentally sensitive areas include tree nurseries, nature protection areas, nature protection monuments, water protection areas, the majority of forested areas and reseeded areas. Boundaries for specific environmentally sensitive areas such as reseeded areas change based on prevailing

environmental conditions and training requirements.

8.3.3 Forest Management Units

Responsibility for forest management activities at the 417th BSB Würzburg is split between the Bundesforstamt, Staatsforstverwaltung, Public Owners and Private Owners:

- Bundesforstamt - ***[insert size in acres (insert size in hectares)]***;
- Straatsforstrevier - ***[insert size in acres (insert size in hectares)]***;
- Public Owners - ***[insert size in acres (insert size in hectares)]***;
- Private Owners -***[insert size in acres (insert size in hectares)]***.

The Bundesforstamt (Federal Forest Service) is responsible for forest management on all land owned by the Federal Republic of Germany. This service is divided into three Forest Inspection Regions (Forstinspektionen) and these are sub-divided into thirty six Forestry Offices (Forstämter). Individual Forestry Offices are sub-divided into several Forest Districts (Forst Bezirke).

The State Forest Service of Bavaria (Staatsforstverwaltung) manages all forests on land owned by the state. It is divided into seven forest authorities (Oberforstdirektionen) and many forest districts (Forstreviere). The forest districts are managed by district foresters (Revierförster).

Public and private owners are responsible for managing the forested areas they own. Usually public owners for example, have their own forest service. Both public and private owners can get technical advice from the relevant Staatsförster (State Foresters). Specific details on the Forest Management Program are provided in Volume III, Chapter 14.3, ***[insert page number].***

CHAPTER 9.0

GEOGRAPHIC INFORMATION SYSTEMS

9.1 RESPONSIBILITIES AND POINTS OF CONTACT

Geographic Information Systems (GIS) implementation within USAREUR is not organized like other U.S. Army programs. The decision to implement GIS is left to the individual offices depending on need and available resources. To support GIS efforts throughout the command, the Environmental Management Office (EMO) at CMTC Hohenfels is available for GIS support services to any USAREUR installation as described in the Integrated Training Area Management (ITAM) Geographic Information System (GIS) Regional Support Center (RSC) Support Services Pamphlet. There is currently no GIS in operation at the 417th BSB Würzburg. The responsibilities and points of contact are listed in Table 9.1.1.

TABLE 9.1.1
RESPONSIBILITIES AND POINTS OF CONTACT

Activity	Responsible Individual/Entity
USAREUR Regional Support Center - GIS Support Services	Mr. Albert Böhm, Chief EMO, CMTC Hohenfels
Overall GIS Implementation	Not applicable
GIS Data/Project Management	Not applicable
Network Administration & Product Support	Not applicable

9.2 SYSTEM DESCRIPTION

There are currently no GIS systems implemented. However, Planning has a significant amount of CADD data that can serve as the basis for several layers for a GIS.

9.3 FUTURE PLANS

The Environmental Office and Planning have expressed a desire to implement GIS within the timeframe of this INRMP. Currently, several programs could benefit from the use of GIS, particularly the conservation program. Several items must be taken into consideration prior, during, and after GIS implementation is initiated and are covered in detail in Section 9.5. Currently, the most prominent GIS system implemented within USAREUR is made by the Environmental Systems Research Institute (ESRI) ArcView desktop GIS software.

9.4 STANDARD OPERATING PROCEDURES

The primary guidance document that exists in the U.S. Army for GIS and spatial data is the Tri-Services Spatial Data Standard (TSSDS) under continuous development at the U.S. Army Waterways Experiment Station in Vicksburg, Mississippi. After careful review of the document and discussions with European Army staff, it was determined that implementing the TSSDS at this time is not appropriate for 417th BSB. The primary reason is that since the TSSDS was developed in the United States with input from U.S.-based specialists, little consideration was given to the unique situations and regulations at an OCONUS installation. This would require considerable modification to the data dictionary, thus defeating the purpose of the standard.

Many GIS user requirements are technology related, and a variety of products and services are available or can be developed to address these requirements. However, selecting, acquiring, and/or developing technological products and services can be a complex and expensive undertaking for individual installations, and can result in varying capabilities across installations. The US Army Environmental Center has published the *ITAM Technology Configuration Management Process Standard Operating Procedure*. Originally, this SOP was intended for the ITAM Program but because it is specifically related to GIS, some very important concepts regarding GIS hardware/software selection and other implementation issues are addressed. The establishment of a technology configuration management process ensures that technological capabilities are developed and used effectively and efficiently regardless of the program because the process focuses on the end-

user requirements. This document may prove useful should the 417th BSB Würzburg decide to implement GIS.

9.5 MANAGEMENT GOALS, OBJECTIVES, AND RESOURCES REQUIRED FOR IMPLEMENTATION

GIS Goal # 1 – GIS Implementation.

GIS implementation at the 417th BSB should begin in the Planning or the EMO. Other offices may decide to implement GIS at a later date and share data with the Planning, such as the Training Support Division (TSD). Several ongoing projects at the EMO or Planning are ideally suited for management with GIS. For example, a tree survey that is being conducted by USAREUR could provide an excellent source of data for the EMO to use, in conjunction with other data, on a regular basis. As stated above, Planning has a substantial amount of CADD data that could serve as the foundation of several layers in the GIS. Integration of these CADD data into the GIS could be a fundamental factor in the selection and operational aspects of the software selected. If using the existing CADD data is a requirement for the GIS, the software selected should minimize the need for format translations. Prior, during and after implementation the following items need to be taken into consideration by whatever entity is in charge of the implementation:

- Identify and/or validate user requirements having technological implications;
- Evaluate existing commercial or government products and services that may address these requirements;
- Oversee development of technological products and services;
- Identify and recommend priorities for technology fielding requirements;
- Identify and recommend priorities for resourcing technology requirements; and
- Recommend general management guidance and direction to the command structure on technology issues involving GIS.

Objectives

1. Streamline the data management activities of the EMO and Planning.
2. Providing better service to the DPW and other divisions in the form of maps derived from user-defined queries, tabular data, aerial photos, etc.
3. Depending on how GIS is implemented, there could be substantial benefits gained through inter-dependence between the EMO or Planning and other divisions. For example, if the costs for GIS implementation was shared between the EMO and the TSD an agreement could be made whereby the EMO maintains ITAM data for the TSD while the system remains in the EMO.

Resources Required for Implementation

In-house Staff: In-house staff should be utilized to complete this goal. Estimated Effort: 12-18 months including training.
Contractors: Contractors can be utilized to complete this goal.
Equipment: The only equipment requirement to complete this goal is acquisition of the GIS software (this assumes the EMO has a computer capable of running GIS software).
Materials: No anticipated material requirements are needed to complete this goal.

GIS Goal # 2 – Digital Data SOP/Requirement.

Whether or not GIS implementation occurs during the 5-year span of this plan, the 417th BSB should begin requiring contractors, universities, or other organizations that provide studies and reports to the EMO to submit digital copies of all work completed. This should not be limited solely to maps and databases but should also to extend reports, spreadsheets, and other office automation software. It is difficult to imagine any organization, particularly universities and contractors, not using word processing and spreadsheet software. Every Schedule of Services, at a minimum, should have a requirement for digital copies of all submitted materials regardless of format. Ideally, the 417th BSB would decide, prior to implementation of the requirement, on a format for general office automation software.

Objectives

1. Obtain digital copies of all documentation created by or for individual divisions within the 417th BSB.
2. Create a library of 'digital references' for use with GIS and/or database software at some future date.
3. Expand and distribute information throughout the 417th BSB more efficiently.

Resources Required for Implementation

In-house Staff: In-house staff should be utilized to complete this goal. Estimated Effort: 1 month (maximum) to devise an SOP or memorandum requiring digital copies of all reports and studies.
Contractors: No contractors are needed to complete this goal.
Equipment: No equipment is needed to complete this goal.
Materials: No anticipated material requirements are needed to complete this goal.

GIS Goal # 3 - Implementation of the Military Activity GIS Interface Concept System.

Military Activity GIS Interface Concept (MAGIC) is a customized, easy-to-use ArcView GIS interface designed to support the needs of company commanders, trainers, installation commanders, ITAM personnel, and other installation personnel who need to view spatial information. The tool contains seven user group modules with each module containing five to ten topics. Individuals who use MAGIC are associated with a specific user group; each user group module is password protected for data security purposes.

Objectives

1. Some of the information currently exists at the installation and could be easily integrated into the MAGIC software at minimal cost to the installation for data collection. In addition, if GIS Goals #1 and #2 are implemented, MAGIC could serve as the first application for GIS and data management within the 417th BSB.
2. MAGIC was developed by the U.S. Army and is therefore available free to the

installation. This would eliminate the need to try to develop other projects to provide the same tools to managers as MAGIC.

3. MAGIC is being distributed through the MACOMs. For more information on MAGIC, contact Mr. John Phillips at the Southeastern GIS RSC, jphillips@interserf.net or (804) 633-8752; DSN 578.

Resources Required for Implementation

In-house Staff: In-house staff should be utilized to complete this goal. Estimated Effort: 12-18 months.

Contractors: No contractors are needed to complete this goal.

Equipment: The only equipment requirement needed to complete this goal is acquisition of the MAGIC software.

Materials: No anticipated material requirements are needed to complete this goal.

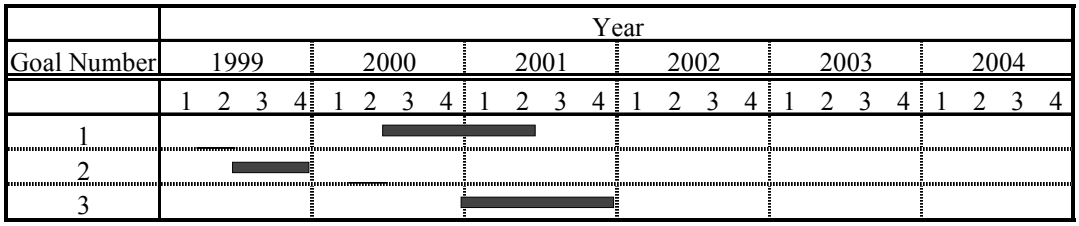
9.6 PROJECT/PROGRAMS PRIORITIES

Goal Number	Priority	Development Responsibilities
GIS Goal #1	Important	EMO/Planning
GIS Goal #2	Important	DPW
GIS Goal #3	Important	EMO/Planning

9.7 COST SAVINGS OPPORTUNITIES

It is difficult, without further study, to quantify the cost savings associated with implementing GIS Goal #2. However, it can be argued that any reduction in time through better dissemination of information within the 417th BSB and indeed between the 417th BSB and the 98th ASG and USAREUR will save money in the long term.

9.8 IMPLEMENTATION SCHEDULE



9.9 IMPLEMENTATION FUNDING OPTIONS

Since most information technology implementation activities are not part of any specific Army program, additional hardware, if required, which may need to be purchased would likely require Operations and Maintenance (OMA) or Automated Data Processing (ADP) funds. In the case of the Goal #1, ITAM Program funds could provide some of the of funding needed.

9.10 COMMAND SUPPORT

If GIS Goals #1 and #3 are implemented, the support of the DPW Commander, the TSD, the USAREUR ITAM Program Manager and the Directorate of Training (DOT) would be required. GIS Goal #2 would require the support of the BSB and/or the DPW Commander.

APPENDIX A1:
BIBLIOGRAPHY

BIBLIOGRAPHY

98th ASG. 1995. EMO. *Environmental Spill Prevention and Clean-up Plan*.

98th ASG. July 1995. *Local Training Area Battle Book*.

417th BSB. Würzburg. *Pest Management Plan*.

Argonne National Laboratory. 5 April 1996. *98th ASG DEH Environmental Program, Hazardous Waste Management Plan.*

Assaad. 27 January 1999. Real Property. *Personal Communication.*

Assaad. 10 February 1999. Real Property. *Personal Communication.*

Bavarian Ministry of th Environment. no date. *Studies on the evaluation of wildlife for protection at U.S. Military Training Facilities in Lower Franconica and Upper Palatinate (Klosterforst near Grosslangheim, Fuchsstein and Freihöls near Amberg) - Studies on the medium-range survival dynamics of important indicator butterfly species in Lower Franconica (Schweinfurt Basin, Middle Main Valley, Steigerwald foothills) snd dragonflies in Upper and Lower Franconia. - (unpublished expert opinion on behalf of the Bavarian Ministry for the Environment (LfU)*

Bayerisches Klimaforschungsverbund, 1996. *Klimas von Bayern.* München.

Bayern Rote Liste. no date. *Bavarian Red List.*

Belting and Geise. 1993. *Naturschutzfachliche Bewertung der militärischen Liegenschaften "Steinbachtal", "Klingholz", "Helmstadt" und "Gieshügel" (Roman Hill).*

Bussler. 1994. *Die xylobionte Käferfauna der Mittel- und Niederwälder auf militärischen Übungsplätzen und in Referenzgebieten Nordbayerns, Mskr. 39 S. BayLfU M*

Commanders Brief. no date. *Power Point Presentation*.

Corbin. Range Control – ITAM Program Manager. *Personal Communication*.

Department of the Army. 21 March 1997. *Memorandum; Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys and Integrated Natural Resources Management Plan.*

Department of the Army. 1995. *Integrated Training Area Management Program Strategy - Final Draft.*

Department of the Army. 25 February 1986. Technical Manual 420-74, *Natural Resources Land, Forest, and Wildlife Management.*

Department of the Army. July 1982. Technical Manual 5-630, *Natural Resources Land Management.*

Department of the Army. February 1982. Technical Manual 5-635, *Natural Resources: Outdoor Recreation and Cultural Values.*

Department of the Army. December 1981. Technical Manual 5-631, *Natural Resources Forest Management.*

Department of the Army. 21 March 1997. *Army goals and Implementing Guidance for Natural Resources Planning Level Surveys and Integrated Natural Resources Management Plans.*

Department of the Army. no date a. Regulation (AR) 200-3. *Natural Resources - Land, Forest, and Wildlife Management.*

Department of the Army. no date b. *Mission and Structure of the Federal Armed Forces Administration.*

Department of Defense (DoD). March 1996. *Environmental Final Governing Standards for Germany.*

Department of Defense (DoD) Directive 4700.1. no date a.

Department of Defense (DoD) Directive 6050.16. no date b.

Department of Defense (DoD) Instruction 4715.3. no date a.

Federal Ministry for the Environment. June 1994. *Environmental Protection in Germany*. Edited and Published by Federal Ministry for the Environment.

Fink. 27 January 1999. 98th ASG. *Personal Communication.*

Geise. 1995. *Auswirkungen der zentralen Kompostierungsanlage auf die Amphibien- und Reptilienvorkommen im nördlichen Klosterforst.*

Goldstein. December 1997. *SIBER Stakes Help Soldiers Spot Environmentally Sensitive Areas*. http://aec-www.apgea.army.mil

Henning. 27 January 1999. EMO. *Personal Communication.*

Holbrook. 2 March 1999. ODCSENGR, USAREUR Heidelberg. *Personal Communication*.

Justice. 5 February 1999. DPW 279th BSB Bamberg. *Personal Communication*.
Koss. 27 January 1999. EMO. *Personal Communication*.

Mandery, Butterweck, Will, Bimüller and Roth. 1993. *Erhebungen zur Hymenopteren- (Aculeata), Heuschrecken- und Libellenfauna als Grundlage für die naturschutzfachliche*

Bewertung der Lebensräume und für raumplanerische Bewertungen militärischer Übungsplätze der amerikanischen Streitkräfte in Nordbayern

Meyer. 20 January 1999. IVL. *Personal Communication*.

Müller-Westermeier. 1990. *Klimadaten der Bundesrepublik Deutschland; Zeitraum. 1951 – 1980*. Deutscher Wetterdienst, Offenbach a. Main.

Müller-Westermeyer, Gerhard. 1990. *Klimadaten der Bundesrepublik Deutschland Zeitraum 1951-1990; Selbstverlag des Deutschen Wetterdienstes.*

Mühlhofer and Mühlhofer (1993) and Mengling. 1987. *Biotopkartierung Kitzingen: Auszüge der Biotopkartierung für Blatt Kissingen*

Nickel. 27 January 1999. Real Property. *Personal Communication.*

Ogden Umwelt und Energie System GmbH. 1995. *Concept designs and secondary data collection for four Threatened and Endangered Species Surveys: Larsen Barracks and Klingenwald (GE48Z), Harvey Barracks (GE33V) and Klosterforst Training Area (GE45L) Kitzingen, Giebelstadt Army Airfield, Leighton Barracks, Roman Hill Training Area, Würzburg*

Ogden Umwelt und Energie System GmbH. 1997. *Ecosystem mapping and Field Survey Klosterforst Training Area (GE45L) ans Harvey Barracks Training Area (GE33V) 417th Base Support Battalion Kitzingen (plants, birds, amphibians, insects)*

Planchter, H. 1989. *Naturschutzplanung auf wissenschaftlicher Grundlage. Schriftenreihe Bayrisches Landesamt für Umweltschutz. 80: 58-58. München.*

Pröse. 1993. *Grundlagenermittlung zur Bestandsdynamik ausgewählter Schmetterlingsarten im Schweinfurter Becken (Mai bis Oktober 1993), Mskr. Bayer. LfU*

Pröse. 1994. *Faunistische Erhebung zur naturschutzfachlichen Bewertung von US-Militär-Übungsplätzen in Unterfranken und in der Oberpfalz (Klosterforst bei Großlangheim, Fuchsstein und Freihöls bei Bamberg) Schlußbericht ans Bayer. LfU*

Rudolf. 27 January 1999. EMO, Landscape Architect. *Personal Communication*.

Scarbath. 28 January 1999. USAREUR ITAM Program Manager. *Personal Communication*.

Scarbath. 22 February 1999. USAREUR ITAM Program Manager. *Personal Communication*.

Scarbath. 2 March 1999. USAREUR ITAM Program Manager. *Personal Communication*.

Short. 22 January 1999. Range Control – LTA. *Personal Communication*.

Simms. 22 January 1999. Chief, EMO. *Personal Communication*.

Stadtbiotopkartierung Würzburg. no date. *Auszüge der Umgebung von Leighton B. und Roman Hill*

Suck and Bushart. 1995. *General Map of the Potential Natural Vegetation (pnV) 1:500.000, Final Submittal for The Federal Office for Nature Preservation (BfN, Bundesamt für Naturschutz).*

Thal. 21 January 1999. Chief Utilities. *Personal Communication*.

Thal. 10 February 1999. Chief Utilities. *Personal Communication*.

U.S. Army Environmental Center (USAEC). December 1997. *Natural Resources Program*. http://aec-www.apgea.army.mil

U.S. Army Environmental Center (USAEC). 21 March 1997. *Draft Guidelines for Preparing Integrated Natural Resources Management Plans on Army Lands*.

USAREUR. 2 August 1959. as ammended by the agreements 21 October 1971, 18 May 1981, 18 March 1993, and the Revised Supplementary Agreement 29 March 1998. *North American Treaty Organization Status of Forces Agreement (NATO SOFA).*
USAREUR. 9 December 1993. Regulation 200-1, *Environmental Quality Program*.

USAREUR. 3 April 1995a. *The Environmental Compliance Assessment System (ECAS), Volume One USAREUR Protocols.*

USAREUR 3 April 1995b. *The Environmental Compliance Assessment System (ECAS), Volume Two German Protocols.*

Waeber. 1993. *Kartierung der Heuschreckenfauna auf 7 US-Liegenschaften in Unterfranken*

Zeitraum. 1951-1980. Klimadaten der Bundesrepublik Deutschland.

APPENDIX B1:
PERSONS CONTACTED

PERSONS CONTACTED

Name	Title	Building Number	Telephone Number or (DSN)
Ms Assaad	Real Property (417th BSB Würzburg)	221	351 4588 (DSN)
Mr Corbin	Range Control – ITAM Program Manager (417th BSB Würzburg)	256 (Klosterforst)	355-8206 (DSN)
Mr.Elyn	ODCSENG Environmental Division (USAREUR Heidelberg)	3796	370-7699 (DSN)
Mr Fink	98th ASG	256 (Klosterforst)	355-8206 (DSN)
Mr Henning	EMO (417th BSB Würzburg)	221	0931 2964415
Mr Holbrook	ODCSENG Environmental Division (USAREUR Heidelberg)	3796	370-7699 (DSN)
1Lt. Justice	DPW (279th BSB Bamberg)	***[insert number]***	469-1560 (DSN)
Mr Kitzingen	Federal District Forester	N/A	0931 97777
Ms Koss	EMO (417th BSB Würzburg)	221	***[insert number]***
Mr Köstner	Chief, Facility Engineer (417th BSB Würzburg)	144 (Harvey Barracks)	0931 305652
Mr Nickel	Master Planning (417th BSB Würzburg)	221	351 4589 (DSN)
Mr Ohlenschlager	Chief, Buildings and Grounds (417th BSB Würzburg)	221	***[insert number***
Mr Rudolf	Landscape Architect (417th BSB Würzburg)	221	09321 2964619
Mr Scarbath	USAREUR ITAM Program Manager (Grafenwöhr Training Area)	621	475-6902 (DSN)
Mr Short	Range Control – LTA Manager (417th BSB Würzburg)	256 (Klosterforst)	355-8206 (DSN)
Mr Simms	Chief, EMO (417th BSB Würzburg)	221	***[insert number]***
Mr Thal	Chief, Utilities (417th BSB Würzburg)	221	0931 2964451